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SHOP EQUIPMENT REVIEW

Semi-Annual Résumé of Machines, Tools and Accessories described in the Shop Equipment News Section of *American Machinist* during the Last Six Months of 1928

Principal Developments

THREE hundred twenty-six machines and other pieces of equipment are reviewed in the American section of this twelfth semi-annual shop equipment review number of the *American Machinist*, and another 153 items in the European section. This number represents the new equipment described in the Shop Equipment News columns of the *American Machinist* during the last six months, and is an increase of 17 per cent in gross number of items over the preceding six-months' period.

The increase has not been confined to any particular type of machine, but has been general. The fact that in the six-months' period there have been offered in the American market 15 new designs in lathes, 13 in milling machines, 29 in drilling machines, and 27 in grinders, shows that not even the so-called "standard" machine tools are static at the present time. Most of these new designs and re-designs feature "high production" as behind the new offerings. The outstanding points that they have featured are: Greater ease of manipulation, increased rigidity through the use of alloy steel and heat-treated parts, wider use of anti-friction bearings, and better lubrication systems. It is too early to expect any considerable effect on machine-tool design from the introduction of the new cutting alloys, one of which is reviewed in this issue, but the general increase in strength all around, the greater application of hydraulic feeds, and in one case the featuring of alloy steel tail centers, may be the foreshadowing of what is to come. One milling machine maker offered a production miller featuring tool-steel ways ground in position and also interlocking hold-down gibs.

Types of designs that are outstanding are the special-purpose machine tools, especially those built to take care of specific conditions in the automotive and other mass-production plants. Noteworthy in this class is a five-station production center lathe, and a two-spindle opposed-feed milling machine. Two high-production gear hobbers were offered, and a gear shaper having the high-speed internal working parts of light aluminum alloy to reduce inertia. Welding machines are incorporating long-life electrodes, and in one case the machine has a multiple tooling feature to give several different electrode combinations to reach all portions of the piece being welded. Higher production with the same, or greater, accuracy is the factor behind the new designs in grinders. One company featured a machine for the grinding of several surfaces at one setting, while another brought out a grinder with hydraulic feed.

What was claimed to be the largest forging machine ever built was placed on the market during the period, and was for the forging of alloy-steel automotive parts. A line of steel-sided punch presses was brought out. All presses offered during the period showed a greater use of heat-treated and hardened steels.

In the general shop equipment group, heat-treating furnaces are featured with more positive atmosphere control, and electro-magnetic control for quenching. Attention to better finishing is evidenced in the offerings of improved paint spraying equipment, including features for conditioning air and exhausting the fumes. Heavier and larger sizes of lift trucks are offered by several concerns, and an arc-welded traveling crane was put out by one firm. Several designs in testing and inspecting equipment are shown, among them six hardness testers, one of which offered a new departure in method. Two projection microscopes offered for use on Brinell machines indicate greater interest in hardness testing on a production basis. Of the two large measuring machines introduced, one is intended for internal and external measurements, the other measures along two co-ordinates.

Heavy-duty machines predominate in the equipment described in the European section. Among these are a locomotive frame-plate cutting machine, a 3-headed boiler drilling machine, a 32-in. stroke ball-bearing shaper, a gear grinder, several large sized circular saws, and a 6-spindle vertical automatic.

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Boring and Turning Machines

— 1 —

Boring, Drilling, and Milling Machine, Horizontal, Floor, Special

Wm. Sellers & Co., Inc., Philadelphia, Pa. [Vol.69,p. 173]

This special machine was developed for finishing the abutting ends of large built-up structural members of tower and bridge sections. The ends of columns or structures 20x12x60 ft. can be milled. Two milling units are mounted on a bed 80 ft. long, each unit consisting of a floor boring, drilling, and

milling machine having characteristics similar to those of the machine described on page 1032, Vol. 67, of the *American Machinist*.

One unit is mounted on a rotary base at one end of the bed, and can be swiveled by power to an angle of 45 deg. in either direction. The other unit is mounted on a sub-base, adjusted longitudinally on the bed by power. Each of the milling units carries a slotted work table for supporting the structural sections. An intermediate support is provided in the form of a four-wheel truck to take care of any sag in the member. The milling units have the driving motors mounted directly on the heads.

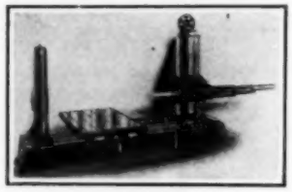
Each unit is equipped with a wide range of boring and drilling speeds and feeds. The horizontal and vertical milling feeds are independent in operation.

— 2 —

Boring Machine, Horizontal, Table-Type, No. 50

Giddings & Lewis Machine Co., Fond du Lac, Wis. [Vol. 69,p.705]

Greater capacity is the feature of the No. 50 table-type horizontal boring, drilling and milling machine. The bed is of massive box-type construction, and the ways are 48 in. over the outer edges. The column is a heavy box section ribbed in both directions, and has a base 40 in. square. The screw for cross feed of the table is mounted on



ball bearings. The Bowen system of lubrication is standard equipment. The speed and feed are through sliding gears and jaw clutches mounted on the bed. Changes in speed and feed are made through levers.

Power to the machine is furnished through two twin-disk friction clutches. A change-gear quadrant is included in the feed gear train so that positive leads can be had.

Longitudinal travel of the spindle, 64 in.; vertical adjustment of the head, 64 in.; working surface of the table, 60x96 in.; table cross travel, 86 in.; 24 spindle speeds in either direction, 5 to 245 r.p.m.; feeds provided, 18; weight, 24,000 lb. net.

— 3 —

Boring Machine, Horizontal, Hydraulic Feed, No. 25 H. H.

Baker Brothers, Inc., Toledo, Ohio. [Vol.69,p.784]

Boring operations on automobile transmission cases and rear axle housings may be performed on this hydraulic-feed horizontal boring machine of the unit-type. The essential elements are the two end frames, to which are attached the sliding saddles, operated by independent Oilgear pumps. On these saddles are mounted the necessary heads, and between the frames is mounted a center frame to accommodate the fixture.

The main heads are driven by independent electric motors.

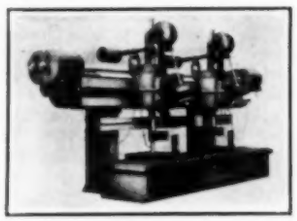
The feed is controlled by a pedal, which is situated conveniently. By using an Oilgear pump for each end, an equalizing mechanism is not required. A pressure gage is located on each hydraulic pump. By means of this, the operator can determine whether the operating conditions are satisfactory. For example if the tools are dull or machining difficult, the pressure will be high.

— 4 —

Borer, Rod, Heavy, Two-Spindle

Niles Tool Works Co., Div. of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.69,p.218]

Boring and facing operations on locomotive connecting rods are performed on this machine. Each spindle is driven by a variable-speed d.c. motor of 15 hp. giving spindle speeds ranging from 8 to 140 r.p.m. The motors are mounted back of the crossrail, and are connected to the spindles through gearboxes. Power is transmitted to the bronze wormwheels on the



spindles by steel worms. Ball thrust bearings are provided on the worms.

The high-carbon hammered steel spindles have a diam. of 8 in. at the lower end. They are counterweighted and have hand adjustment. No. 7 Morse taper sockets can be used. Vertical travel of the spindles is 22 in. They are provided with five hand feeds and six automatic gear feeds ranging from 0.005 to 0.165 in. per revolution.

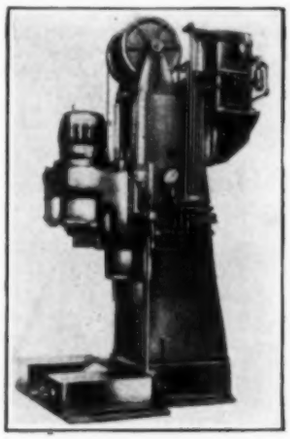
The spindle saddles are adjusted along the rail by rack and pinion to a minimum distance of 36 in. between centers and a maximum distance of 14 ft. 2 in. The maximum distance from the table to the spindle is 30 in. Key slots are provided on the main table for clamping work. Coolant is circulated by two independent pumps. Bushed holes for piloting boring bars are provided in the two movable work tables. The spindles are equipped with facing heads having pilot bars which are guided by bushings in the movable work tables.

— 5 —

Boring and Drilling Machines, Special-Purpose, "Putnam"

Shaw-Crane-Putnam Machine Co., Inc., subsidiary of Manning, Maxwell & Moore, Inc., Fitchburg, Mass. [Vol.69,p.786]

The vertical cylinder-boring unit and the valve-hole drilling and reaming machine are alike in principle of construction, and the only variation is in the head design. In each case the motor is mounted on the head close to the tool and drive is through chrome-vanadium-steel



helical gearing, all shafts being mounted on Timken roller bearings, flood lubricated. Pickoff gears may be applied, giving a 25 per cent variation in spindle speed.

A feature is the separate plate mounting of the Timken bearings which makes it possible to change the center-to-center distances of the spindle by replacing the plates in the head. Extra large spindles are used.

Oilgear hydraulic feed is used on both machines and can be controlled either automatically or manually. The work table can be made to suit requirements.

The cylinder-boring machine can be made to accommodate 4, 6, or 8 spindles. The vertical capacity can be made to suit requirements. A 20-hp. constant-speed motor is recommended.

The valve-hole drilling and reaming machine can be made to accommodate 6, 8, 12 or 16 spindles and the vertical capacity can be made to suit requirements. A 5-hp. constant-speed motor is recommended.

— 6 —

Boring Machine, Axle, Horizontal, Motor-Driven Two-Way-Opposed

Defiance Machine Works, Defiance, Ohio. [Vol.69,p.901]

Heavy boring, reaming, drilling, tapping, and other similar operations on automobile axles can be performed on this special two-way-opposed machine. It can be equipped with Oilgear feed and pump or with mechanical feed.

The machine can be built with single-spindle heads, or with as many spindles as desired. Each head is driven by a separate 5-hp. motor. The length of bed, height of spindle centers, number of spindles in each head,

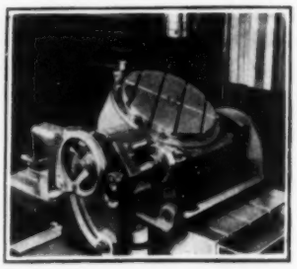
and the fixture are selected to suit the particular requirements. In the model illustrated, the floor space occupied is 228x64 in. Weight, 18,170 lb. net.

— 7 —

Tables, Auxiliary, for No. 2 Jig Borer

Pratt & Whitney Co., Hartford, Conn. [Vol.69,p.1013]

Two types of indexing tables have been developed for the No. 2 jig borer made by the above company. The first is the tilting rotary table, a device which is placed on the regular table, and is held in place by means of clamps. It is used for boring special jigs and drill plates, which are most easily laid out by using polar dimensions. The surface is 12 in. in diam., and is provided with T-slots. The outer edge is graduated in degrees for approximate indexing by means of a large handwheel. For accurate indexing to 5 sec., a small slow-motion



micrometer handwheel is used.

The tilting feature of this table is taken care of by hinging the entire device at one side and raising or lowering it by means of a crank. It may be set at any angle from 0 to 90 deg., to within 5 sec., by means of a vernier.

The large-size indexing table is graduated for rough setting, and is provided with a handwheel and vernier for accurate work. It can be rotated rapidly under power by means of a small motor. It is reversible. This large table is placed on the regular table of the jig borer.

Drilling Machines

— 8 —

Drill, Upright, Motor-Driven, Sliding-Head, 17-Inch

Canedy-Otto Manufacturing Co., Chicago Heights, Ill. [Vol. 69,p.180]

Direct belt drive from a built-in motor is the feature of this machine. Power is transmitted to the spindle by means of a four-step cone pulley drive giving spindle speeds of 1,580, 960, 540 and 260 r.p.m. The spindle is mounted on Timken tapered roller bearings, and has a vertical movement of 7 in. The tapered spindle hole can be either No. 2 or No. 3 Morse. Drills up to ¾ in. can be used.

Both self- and hand-feed types of the machine are available. Either can be equipped

with a 15-in. round table or a 14-in. square table. The distance between the spindle and table can be varied from 0 to 31 in., while the distance from center of the table to the column is 8½ inch.

The ¾-hp. motor runs on 220-volt, 60-cycle, a.c., 3-phase circuits. It is mounted in a sliding bracket, which acts as a belt tightener.

Floor space 16x28 in.; weight with round table, plain, 545 lb., self-feed, 610 pounds.

— 9 —

Drilling and Boring Machine, Upright, Hydraulic, Single-Spindle, Model B-250-H, Natco

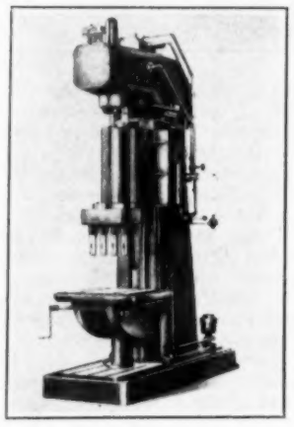
National Automatic Tool Co., Richmond, Ind. [Vol.69,p.333]

Drill heads can be quickly attached to this machine, which has a semi-automatic hydraulic feed. The machine has capacity to drill 2½-in. holes in steel at 0.010 in. feed.

The head has one large No. 5 Morse-tapered alloy steel spindle, which is ball bearing mounted. From the center of the spindle to the column is 14 in., and the length of feed is 20 in. An adjustable knee-type table is used. The minimum height of the working surface is 28 in., with an adjustment of 17¼ in. The area is 20x26 inches.

Power is applied through a train of change gears, thence to a set of spiral bevel gears direct to the spindle. A 10-hp. motor is used. Speed changes range from 93 to 329 r.p.m. A special slow-speed head giving spindle speeds from 25 to 100 r.p.m. for boring can be furnished.

One low-pressure, oil cylinder, 6½ in. in diam., actuates the



head with a pressure of approximately 6,600 lb. Pump and oil reservoir are located on and in the top of the column, respectively, the pump being driven from the main drive shaft. Any feed from 0 to 15 in. per min. can be obtained. The rapid traverse rate is 70 in. per minute.

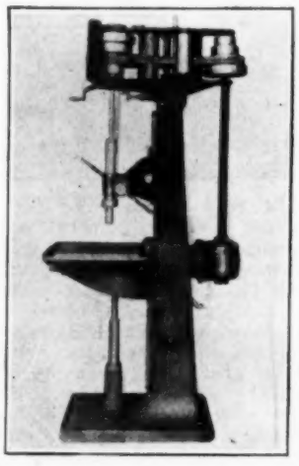
Floor space 34x85 in.; height 131 in.; weight 8,000 pounds.

— 10 —

Drilling Machines, Multiple-Spindle Sensitive, Model K, "Demco"

Demco Drilling Machines, Div. of the Merit Oil Equipment Co., 6616 Morgan Ave., Cleveland, Ohio. [Vol.69,p. 904]

From one to six spindles may be obtained on the Model K sensitive drilling machines. The overhang of the spindles may be either 8 or 12 in., and the dis-



tance between them is 9½ in. A motor can be substituted for the gearbox unit on the belt-driven machine, and is direct-connected to the vertical drive shaft by means of a slip coupling. In the case of a multiple-spindle machine, a single motor may be used to drive the spindles. Other features of these machines are the sliding head, the belt shifter, the automatic constant-tension idler, and the spindle.

The spindle is ball-bearing mounted, and is held in a sliding head. The bracket for the cone pulleys and belt-shifter is in one piece. The cones and idler are removable.

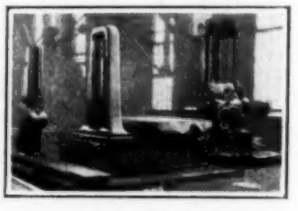
The base of the pedestal forms a lubricant tank, and a standard type of pump built into the rear drive shaft is provided. Power feed to the spindle may be obtained as extra equipment. The device can be set for continuous operation, and is fully automatic.

— 11 —

Drilling Machine, Horizontal, Combination Floor and Table Type

Joseph T. Ryerson & Co., Inc., 16th & Rockwell Sts., Chicago, Ill. [Vol.69,p.179]

Both large and small work can be machined on this horizontal drilling, boring, and milling machine, which is a combination of the floor-type and table-type horizontal drilling machines. The floor-type machine has a single saddle with vertical movement on its col-



umn; a column with horizontal movement, and an outer boring bar support, which has a hand movement on the bedplate parallel to the spindle travel. It is direct motor driven, and all speeds, feeds, and power traverse to the spindle, spindle-head and column are controlled from the head. The outer boring bar support and the main post are fitted with verniers and scales reading to thousandths.

A special, removable, self-contained and portable table, is mounted on the bedplate on the table-type machine for machining small pieces. The table has movements parallel to the spindle travel and also with the column travel. It is operated by hand, but is so arranged that an electric-motor drive can be supplied, giving the table milling feeds and rapid traverse.

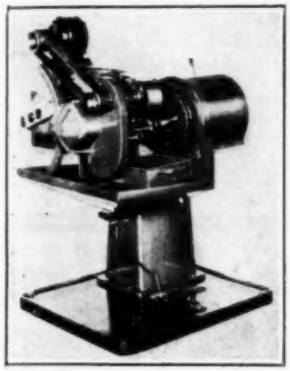
— 12 —

Drilling and Tapping Machine, Horizontal

Anderson Die Machine Co., Bridgeport, Conn. [Vol.69,pp. 176 and 259]

Small parts may be drilled and tapped rapidly on this horizontal machine, which is arranged with a dial plate having 32 openings. Production is quoted at 60 pieces per minute.

A sturdy box column carries the machine. The apron is of



large size to catch lubricant and chips. Four spindles, two drilling and two tapping, are driven by a belt from the small motor mounted on the pivoting bracket at the top of the machine. Power for reciprocating the spindles and rotating the dial plate is derived from the large motor mounted at the rear. Control of both motors is effected from a single switch.

The dial-plate segment wheel contains 16 teeth so that two work pieces are finished at each indexing. Should an ill-fitting piece be placed in the dial plate, the plate can be turned back to any amount for removal of the piece.

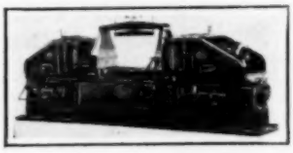
As the drills advance to the work, they enter special bushings in arms equipped with springs which press pilots into holes in the hardened steel faceplate, thus holding the pieces rigidly for drilling. Stops will not permit pieces to pass that are not properly seated in the dial openings, and a spring assists in pressing the pieces into place.

— 13 —

Drilling, Unit, Hydraulic, Sliding-Head, 6-Inch, Natco

National Automatic Tool Co., Richmond, Ind. [Vol.69,p.375]

All holes in both sides or both ends of cylinder blocks can be drilled in one operation



on machines employing two of these units. They may be built into machines drilling cylinder blocks, body brackets, or other pieces requiring similar treatment. The capacity of the 6-in. unit is five 1-in. holes in cast iron at 0.009 in. feed per rev. The maximum travel for the standard unit is 12 in., and the motor size required is 7½ hp. The maximum feeding pressure is 5,600 lb. Feeds vary from 0 to 15 in. per min. Rapid traverse is approximately 80 in. per minute.

Weight 4,000 pounds.

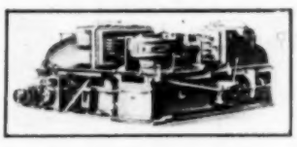
— 14 —

Drilling Machines, Horizontal, Two-Way, Fixed-Center, Multiple-Spindle, Special

Defiance Machine Works, Defiance, Ohio. [Vol.69,p.479]

The two types of this two-way drilling machine are horizontal right-angle and horizontal-opposed. The former is adapted to production drilling of transmission cases, motor blocks and similar work, and is suitable for drilling all holes in the ends and bottom. The opposed-head machine is suitable for drilling only two opposite faces.

The heads are fitted with alloy steel spindles running in Timken roller bearings. The number of spindles per head is



variable. Both machines are equipped with a heavy fixture, which has a hardened plate and locating pins for centering. A roller conveyor table on each raises the pieces to the fixture, and an eccentric forms a stripper for raising the cases off the pins. A roller conveyor is provided for removing the work.

Oilgear feed is used on both machines, and both have rapid traverse forward.

Floor space, right-angle machine, 138x132 in., horizontally-opposed machine, 180x64 in.; weight of the right-angle machine, 18,700 lb.; horizontally-opposed machine, 19,580 pounds. The strokes of the heads are 16 and 18 in. for the angle and horizontal opposed machines, respectively.

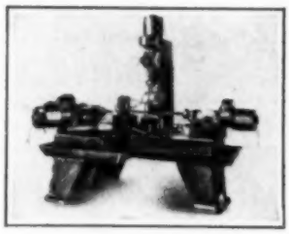
— 15 —

Drilling Machine, Automatic, Special-Purpose

Millholland Sales & Engineering Co., 1823 Ludlow Ave., Indianapolis, Ind. [Vol.69,p.373]

Drilling and spot-facing of four holes of similar size in seven malleable castings of different length is the work of this machine. The holes are drilled by means of four automatic drill-head units mounted on the base, and controlled by compressed air.

At one end of the parts, there are two holes intersecting at an



angle of 45 deg., and also some parts are left- and some right-hand. The intersecting holes are drilled by two units mounted in saddles and dowelled and bolted to a swivel plate. To compensate for the different lengths encountered, the swivel plate carrying the two angularly mounted heads is placed upon a false table, which can be adjusted in and out by means of a handwheel and screw.

The units are entirely independent of each other and have separate driving motors. The feed of the cutting tools is accomplished by a plate cam, designed to feed the drills 0.015 in. and spot-face at 0.005 in. per rev. A motor-driven pump supplies ample coolant.

— 16 —

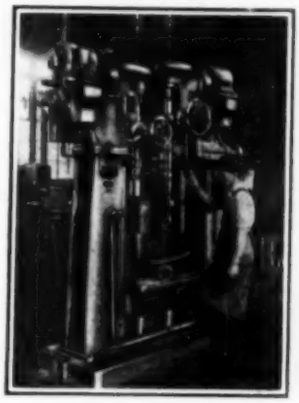
Drilling Machine, Connecting-Rod, Opposed-Spindle, Special, No. 210

Barnes Drill Co., 814 Chestnut St., Rockford, Ill. [Vol. 69,p.668]

Connecting rods may be drilled on this special No. 210 opposed-spindle drilling machine. Each head has an individual motor, and that to the right is provided with lateral adjustment to accommodate various center distances.

Each unit has ball and roller bearings, spur-geared feeds, and is self-oiling. The heads contain all the working parts including the pump for the self-oiling system. All the spindles have roller bearings in several rows of short and long rollers. The heat-treated steel crown gears may be changed to obtain faster or slower speeds, and the feed trip gears are conveniently located on the right-hand side. The gearing throughout is of alloy steel. Power feeds may be engaged or disengaged when the spindle is running.

The machine illustrated is set up for a connecting rod with a



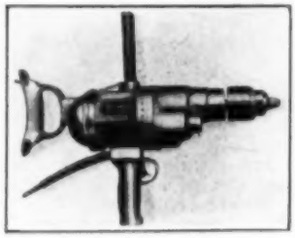
center distance between holes of 16½ in., but the same unit can be used for rods having a 14-in. center distance between holes.

— 17 —

Drill, Electric, Heavy-Duty, ¾-Inch

Black & Decker Manufacturing Co., Towson, Md. [Vol. 69,p.258]

Straight-shank drill bits up to ¾ in. can be accommodated in the three-jaw, geared-chuck of this drill. The machine is



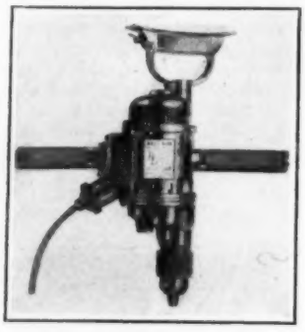
equipped with a universal motor, which has the armature and spindle thrusts taken on ball bearings.

— 18 —

Drills, Electric, "Bull Dog"

National Electric Products Co., 140 Baxter St., New York, N. Y. [Vol.69,p.374]

Capacities are ¼, ⅜, ½, ⅝ to ¾, and ⅞ in. The ¼-in. drill operates on 110-volt, 25- to 60-cycle, a.c., or 110-volt d.c. circuits. It has an all-aluminum body, rubber-covered handles, and an improved plunger switch. The attachment plug is unbreakable.



Spindle runs in SKF ball bearings at 270 r.p.m. when loaded. A three-jaw chuck is standard.

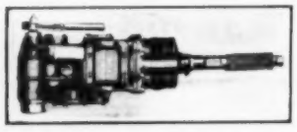
The ½- to ¾-in. size is a double-action drill giving speeds of 850 and 425 r.p.m. The ⅞-in. drill weighs 22 pounds.

— 19 —

Drill, Close-Quarter, Air-Driven, Size 90

Ingersoll-Rand Co., 11 Broadway, New York, N. Y. [Vol. 69,p.636]

This gear-driven, close-quarter drill with a two-cylinder, double-acting, air motor has been brought out for general drilling, reaming, and tapping. The length of feed is 2½ in. and reamers and taps 2 in. in diam., and drills 3 in. in diam. may be used. The length overall is



9¼ in. Smooth operation at 140 r.p.m. has been secured at an air pressure of 90 lb. per sq.in. The crank is counterbalanced. Special gears are used for the drive. Three different spindles can be furnished, namely for standard No. 4 taper sockets, the "Rich" chuck, and the "Use-Em-Up" taper.

Anti-friction bearings are used throughout.

Weight 41 lb. net.

— 20 —

Drills, Electric, ¼-Inch, Special

U. S. Electrical Tool Co., Cincinnati, Ohio. [Vol.69,p.667]

These two special electric drills are built to operate at 2,000 and 10,000 r.p.m., respectively. The first has a universal motor for operation on d.c.

or a.c. at 60 cycles or less. Other features are an aluminum body, a positive make-and-break switch, and SKF ball bearings. The keyless chuck has capacity for drills from 0 up to ¼ in. Dimensions are 10½x2⅞ in. Weight 4⅛ lb., net.

The 10,000-r.p.m. machine illustrated has the same features as the other type. Nickel-steel gears are used. The dimensions are 10½x2⅞ in., and the net weight is 4 pounds.

— 21 —

Drills, Electric, Portable

Stanley Works, New Britain, Conn. [Vol.69,p.709]

A line of electric tools comprising portable drills in ten types are available. The offset of the spindles permit drilling in close quarters. All parts are

readily accessible, and the handles incorporate the standard quick make-and-break type switch. A fan mounted on the armature shaft draws an ample supply of air into the frame. The motors are dynamically and statically balanced.

All gears are made of special alloy steel, and are heat-treated. They run in grease. Ball bearings are used on both ends of the armature shaft, and are set in steel jackets molded into the aluminum castings. Radial ball thrust bearings are used on all spindles in addition to long sleeves. Heavy-duty, three-jaw chucks are standard. The chuck key for all sizes is securely fastened in the recess of the drill.

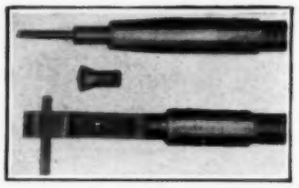
The sizes have capacities ranging from ¼ to ⅞ in. in steel and ⅜ to 2 in. in wood. The weights range from 6½ to 20½ pounds.

— 22 —

Drill, Right-Angle, Close-Quarter, "Midget"

Charles A. Koza, 464 Augustine Ave., Rochester, N. Y. [Vol.69,p.750]

The "Midget" close-quarter, right-angle drill is the smallest of a line designed for getting into confined spaces. It is driven by a flexible shaft held in the chuck of an electric drill. Drills from 0 to ¼ in. can be taken, each size being held in its own



collet. The body is of bearing bronze, nickel plated, and the width is ¾ inch.

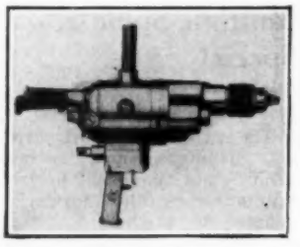
— 23 —

Drill, Portable, Heavy-Duty, ¾-Inch

U. S. Electrical Tool Co., Cincinnati, Ohio. [Vol.69,p.751]

This ¾-in. drill is designed for service at a spindle speed of 350 r.p.m. It is equipped with a universal motor for operation on a.c. lines at 60 cycles, or on d.c. circuits. A three-jaw screw-back chuck taking straight shank drill bits is standard construction.

Features common to the line include SKF ball bearings,



chrome nickel steel gears, one-piece aluminum body frame and commutator head, and quick make-and-break type two-pole trigger switch.

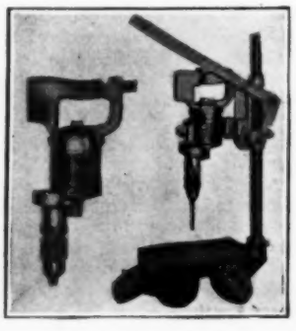
Weight 27 pounds.

— 24 —

Drill and Drill Stand, Portable, ⅜-Inch

Wodack Electric Tool Corporation, 4627 West Huron St., Chicago, Ill. [Vol.69,p.866]

Besides drilling, the machine is suitable for buffing and grinding. It is powered by a General Electric universal motor of the variable-speed type, controlled by a trigger switch. The drill stand is so designed that the drill may be held vertically for



drilling or horizontally for grinding and buffing.

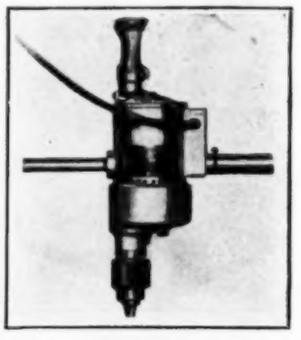
Weight 7½ pounds.

— 25 —

Drill, Electric, Low-Speed, ⅝-Inch

James Clark, Jr., Electric Co., Louisville, Ky. [Vol.69,p. 979]

To permit easy drilling of tough steel, this ⅝-in., low-speed electric drill has been introduced. It is similar to the No. 2-U size manufactured by the above company, except that it has a speed of 250 r.p.m. when loaded. The unit method of design makes for easy cleaning,



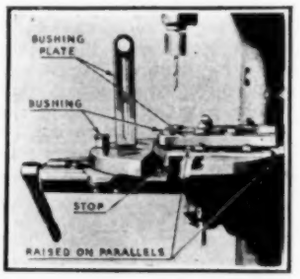
inspection and repairs. All connections are on the main casing. Universal chucks are attached to the spindle by means of a taper fit.

— 26 —

Jig, Universal, for "Combination" Drill Table and Vise

Modern Machine Tool Co., Jackson, Mich. [Vol.69,p.259]

This jig is applicable to the "Combination" drill table and vise manufactured by the above company. It consists of a special slotted stop and bushing plates. The slotted stop is



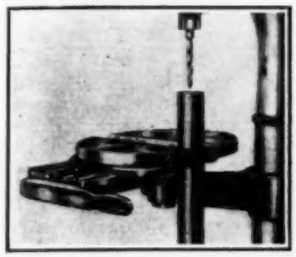
bolted to the top of the Combination, against its stop. Bushings of the proper size are placed in the plates, and located over the work as required. Standard bushings may be used. The plates may be bolted to the table or set on parallels to the required height. The adjustable feature makes the device suited to quick set-ups for repeat processes or infrequent jobs.

— 27 —

Drill Table and Vise, Combination, 8- and 28-Inch

Modern Machine Tool Co., Jackson, Mich. [Vol.69,p.336]

These 8- and 28-in. sizes weigh 27 and 600 lb., respectively. The 19-in. size was described on page 203, Vol. 58, of the *American Machinist*. All models embody the same design. The 8-in. drill table is used with electric



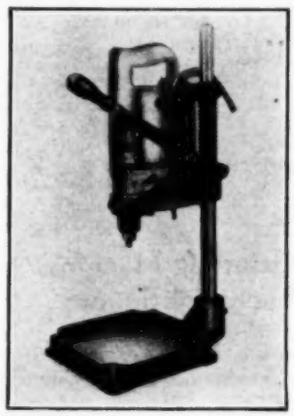
drills and small radial drills, while the larger size is built primarily for railroad repair shops. The jaws of the small vise open to 4¼ in., whereas the jaws of the larger open 12 inches.

— 28 —

Fixed Holders for Portable Drills

Stanley Works, New Britain, Conn. [Vol.69,p.709]

The No. 530 bench stand is designed for use with Nos. 562, 142 or 141 drills for buffing, scratch brushing, and small grinding. The drill is held



firmly by means of one clamping screw. The weight is 4¼ lb. net. Drill stand No. 532 is used for converting portable electric drills Nos. 562 and 142 into small drill presses. The drill is securely locked in place by tightening one clamp screw only. The Nos. 533 and 534 are the same except that No. 534 is mounted upon a wall bracket. The height of the column is 30 in., and the maximum length of feed is 4 inches.

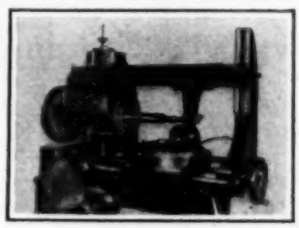
Gear Cutting and Testing Machines

— 29 —

Hobbing Machine, "Spirit of Production," No. 3

Newark Gear Cutting Machine Co., Newark, N. J. [Vol. 69,p.553]

Both universal and plain types of the No. 3 hobbing machine have been added to the above company's line of "Spirit of Production" machines. Helical gears, herringbone gears, spur gears and wormwheels can be cut on the universal machine, while spur gears, spline shafts and wormwheels can be handled on the plain type. Capacity of these hobbers is 18 in. using a support arm and 24 in. without this member. Spur gears up to



14-in. face can be handled on either type, while 12-in. helical gears up to 30 deg. helix can be handled only on the universal machine. An improved differential allows separate control to the lead, feed and indexing.

The horizontal cutting principle is used on these machines. The machine has rapid traverse movement to the cutter carriage in both directions.

Shafts with any number of splines and of any practical length may be hobbed. A tangential attachment is available for generating wormwheels with either taper hobs, star cutters or fly tools. Capacity in steel is 4 D.P. and in grey iron it is 3 D.P. The largest hob that may be used is 4½ in. in diameter by 5 in. long, and is carried on a 1¼ in. hob arbor of the removable type. Hob speeds range from 38 to 145 r.p.m. and the feeds per rev. of the work range from 0.015 to 0.250 in. At full capacity 5 hp. is required.

Length 7 ft., width 4 ft., height 5 ft. 6 in. Weight 6,000 pounds.

— 30 —

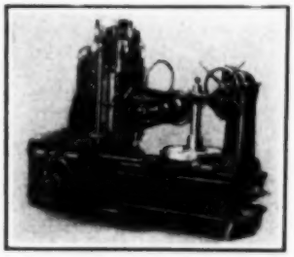
Gear Hobber, High-Production, No. 10, Schuchardt & Schutte

George Scherr Co., 142 Liberty St., New York, N. Y. [Vol.69,p.557]

High-production of spur, worm and spiral gears with involute teeth can be obtained on this gear hobber, as well as special work when the differential attachment is used. The hobber is manufactured by Schuchardt & Schutte, Germany. The maximum size of spur gears that can be hobbed is 40 in., and the maximum face width is 14 in. The maximum D.P. that can be cut is 2½.

The standard machine is built for single-pulley drive from overhead countershaft in conjunction with a sliding gearbox, furnishing six geometrically progressive speeds. The machine can also be supplied for direct electric drive. The cutter head is fixed to the slide, which moves on the vertical column, and can be swivelled through 360 deg. A flywheel is placed on the cutter spindle and another flywheel is fitted on the vertical driving shaft. Both power rapid traverse and hand adjustment are provided for the cutter head as well as the table. Quick return of the cutter head is independent of the feed mechanism.

The differential and feed gearbox are required for the production of wormwheels by means of the tangential-feed



head. With the standard dividing change gears, all numbers of teeth from 5 to 100 can be cut.

— 31 —

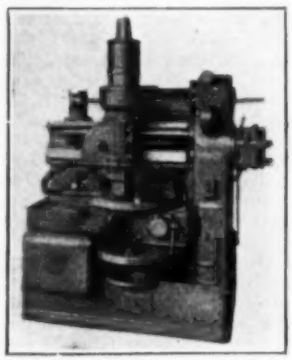
Shaper, Gear, No. 6A

Fellows Gear Shaper Co., Springfield, Vt. [Vol.69,p.855]

Production cutting of both spur and helical internal and external gears can be done. External gears up to 18 in. in pitch diam. with 5-in. face, and internal gears up to 18 in. pitch diam. with 3-in. face can be cut.

The apron is operated by cams, and is positively controlled in both directions. Four reciprocating speeds are provided, ranging from 111 to 400 strokes per min. The six different feeds range from 720 to 1,620 strokes of the cutter per revolution per min. The double-cut mechanism has been retained in the No. 6 machine, but it is completely automatic in operation. The machine stops at the end of the cut.

Three different styles, known as the Nos. 61-A, 612-A, and



615-A, are manufactured. The No. 61-A is adapted particularly for arbor work. The No. 612-A is adapted only to 4-in. cutters with 1¼-in. holes. The No. 615-A is adapted to cutting herringbone internal and external gears and uses helical cutters with 1¼-in. holes, or 4-in. spur cutters with 1¼-in. holes.

Net weight of any type is 5,800 lb., approximately.

— 32 —

Worm and Thread Milling Machines, Automatic, Nos. S. F. 1 and S. F. 2, Pfauter

O. Zernickow Co., 15 Park Row, New York, N. Y. [Vol. 69,p.861]

These machines differ only in size. They have been developed by Herman Pfauter, Chemnitz,

Germany, and have been placed on the market in the United States by the above company. Maximum worm diameter that can be cut on the S.F. 1 is 9¾ in., and on the S.F. 2 is 11⅛ in. Maximum circular pitch at one cut by the former is 1½ and by the latter 2½ in. The speed can be changed by putting on different pairs of spur gears.

The cutter head is mounted on a swiveling base. Tilting of the cutter head is effected by a worm drive built into the upright. The spindle is adjustable axially, and its main bearing is adjustable radially. The work may be mounted between cutters, on work arbors, in special collets, or in bushings with differential locking nuts. The end of the work opposite to the index head is supported by a tailstock. Travel of the table is

effected through a leadscrew of large diam. and the axial thrust is taken by ball bearings. The feed drive is carried out by change gears, which can be disengaged automatically or by hand.

A coolant pump having 7-gal. delivery is furnished. Worms from 2 to 20 starts can be cut. Maximum length of the smallest diameter worm is 19½ in. in both cases, whereas for the largest diameter the length is 22 in. for the first machine and 26⅜ in. for the second machine. Cutting speeds of from 30 to 81 r.p.m. are provided for the first, and from 25 to 76 r.p.m. for the second.

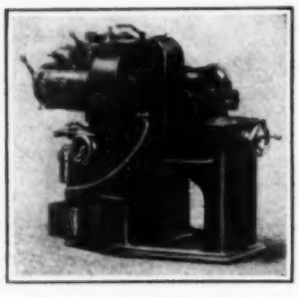
Floor space required: 67x75 in. and 71x79 in., respectively. Weights, 3,860 and 6,060 pounds.

— 33 —

Lapping and Testing Machine, Gear, Combination, 18-Inch

Gleason Works, Rochester, N. Y. [Vol.69,p.703]

The required horizontal and vertical motions are combined in this machine so that the resulting motion of the mechanism will follow the tooth curve already generated. The action is automatic and the direction of the motion can be changed to suit the work. Gears up to 18-in. pitch diam. can be lapped. The maximum offset obtainable when testing "Hypoid" gears is 3½ in. The maximum distance from the center of the gear spindle to the nose of the pinion



spindle is 12 in., and the minimum distance is 3¾ inches.

The drive spindle can be run in either direction, and is provided with a lock for use when tightening and loosening arbor nuts. It also has a wooden-lined friction brake for testing gears under load. The standard work spindles are ground 2,292 in. at the large end, with a ½-in. taper per ft. The spindles are mounted upon matched ball bearings. These bearings are mounted under sufficient initial load to provide against radial or axial deflection.

The pinion spindle head and the gear head column are adjustable horizontally on the frame. A 5-hp. motor, set in the base, furnishes power.

— 34 —

Chamfering Machine, Gear-Tooth, "Peerless"

City Machine & Tool Works, 1517 E. Third St., Dayton, Ohio. [Vol.69,p.713]

Internal and external teeth on gears may be chamfered to any shape by this machine. Timken tapered roller bearings are furnished on the spindle, which is driven by a 1½-hp. motor. Tests have shown that 45 teeth per min. can be chamfered, de-

pending upon the pitch and form required. The standard machine will accept gears up to 10 in. in diam. It is equipped with a No. 1 B & S geared pump for cutting lubricant, and its spindle operates at 1,600 rev. per minute.

Height 49½ in.; length 36 in.; width 25 in.; weight 1,800 lb. net.

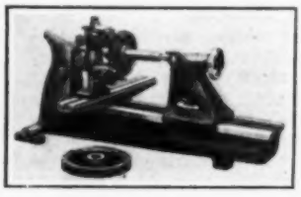
— 35 —

Gear Tester, Quick-Reading, Société Genevoise

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol. 69,p.558]

Rapid inspection of gears may be performed on this gear tester, which is manufactured by the Société Genevoise d'Instruments de Physique, Geneva, Switzerland. Its range includes the testing of pitch and eccentricity of bevel, helical and spur gears with straight, oblique or spiral teeth, and the profiles of the teeth of the helical and spur gears.

The tests of eccentricity and pitch are made simultaneously. For these tests two dial indicators with contact points and lever systems are mounted on a column. Six sets of contact points are furnished, which take care of the range of 25 to 3.5 D.P.,



but contact points for other pitches down to 2 can be supplied. The apparatus will test gears up to 11¾ in. in diam., and has a minimum distance between centers of 15¾ inches.

— 36 —

Fixture, Truing, for Spiral Gear Cutters

Gleason Works, Rochester, N. Y. [Vol.69,p.597]

Circular cutters may be checked on this truing fixture, which is intended for use in connection with the spiral bevel gear generator manufactured by the above company. The fixture consists essentially of a spindle made to accommodate the various sizes of spiral bevel gear cutters. A large handwheel is used for turning the cutter to the desired point for check-

ing. The spindle is mounted in precision ball bearings, and is ground in place. Several different measuring instruments may be used, all of which read to 0.0001 in. The fixture is mounted on a rigid base, which is adjustable for height.

Grinding Machines

— 37 —

Grinder, Face and Knife, Heavy-Duty, No. 74

Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn. [Vol.69,p.857]

Oilgear table drive has been incorporated in the No. 74 heavy-duty grinding machine, which is available in fourteen sizes having table lengths from 50 to 216 in. The oil pump, which actuates the work table, drives an oil motor that in turn drives a short gear train meshing with the work-table rack. At reversal, the flow of the oil moves in the opposite direction through the circuit. This is done smoothly and uniformly so

that even at the highest table speed, which is 90 ft. per min., there is no shock and only a moderate peak load.

The table speed may be changed at any time by merely turning a handwheel or stopped by opening a bypass valve. The hydraulic automatic feed varies from 0.00025 to 0.010 in., and is positive and adjustable to quarter-thousandths. Adequate arrangements are made for cooling the work by means of two fully-adjustable coolant nozzles. A 26-in. sectional grinding wheel is used, having means for taking up wear.

Either an angle bar or a revolving knife bar is furnished with the grinder, and a magnetic angle bar, knife bar, or chuck may be furnished extra. If desired, the table may be equipped with a vertical-face magnetic chuck made in variable lengths and heights.

All table driving gears and the table rack are splash lubricated. Other parts are oil immersed and Zerk high-pressure lubricators are used where necessary. Three motors are used to drive the machine. The grinding-wheel-spindle motor varies in size from 15 to 25 hp. The carriage driving motor is of 5 hp., and the pump motor is 1 horsepower.

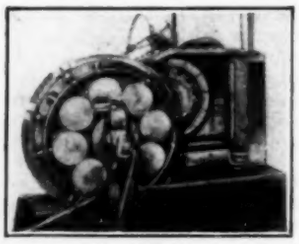
Floor space for the smallest size is 17 ft. 2 in. by 8 ft. 6 in., while for the largest size it is 43 ft. 2 in. by 8 ft. 6 in. Weights 9,900 and 19,000 lb., respectively.

— 38 —

Grinding Machine, Face, Continuous

Diamond Machine Co., Providence, R. I. [Vol.69,p.860]

The principle of continuous operation has been applied to this machine, which is designed for grinding clutch plate faces. Up to and including the grind-



ing wheel, the parts are practically the same as those in the standard Diamond face grinding machines. Beyond that point the parts are special and may be varied for different machines to suit the class of work.

A revolving work-holding fixture is substituted for the usual reciprocating table. Mounted on this are a number of small air-operated chucks, each of which is rotated by its individual motor. Stopping and starting of these small motors is automatic, all being commutated through a central commutator around which they revolve. These independently rotating units are carried across the face of the grinding wheel in a vertical plane.

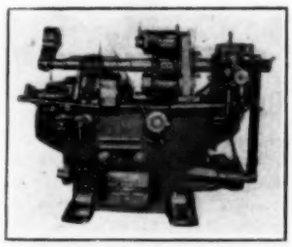
The carrier makes one revolution in 0.7 min. At this speed the output is 5.6 pieces per min. An endwise adjustment of 8 in. is provided for. Magnetic or hand-operated chucks can be used in place of the air-operated chucks, and the number and size can be changed. The chucks engage and disengage by means of dogs on the frame, that strike pins on the clutch mechanism. The work-unit driving motors is cut off and braked before the clutch opening dog is reached.

— 39 —

Grinder, Face and Hole, No. 12-A

Bryant Chucking Grinder Co., Springfield, Vt. [Vol.69,p.1011]

This machine is similar in general construction and dimensions to the No. 12 motor-driven machine described in Vol. 67, page 402, of the *American Machinist*, except that it has



a facing head unit. It has the same maximum swing of 16 in., and maximum stroke of 11 in. The wheelslide has a bracket that contains the facing wheelhead mounted on the front. It is possible to change the position of the facing wheel to eliminate interference from the hole grinding wheel, while the facing wheel is in use. Both wheels are driven from the same motor by means of a single canvas belt. The motor is mounted on top of the wheelslide.

The machine is equipped with an outside diameter stop, which is operated by a lever beneath the cross-feed handwheel and throws a floating stop over the feedscrew roll. This movement changes the position of the wheels for another operation without disturbing the crossfeed screw position. With this machine it is possible to obtain accuracy in squareness and concentricity of the various surfaces.

— 40 —

Grinders, Surface, Hydraulic-Feed, Nos. 4 and 5

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.69, p.597]

Rapid and fine adjustment of the wheelheads is furnished on these surface grinders. For rapid adjustment of the wheelhead, a large handwheel, grad-

uated in quarter thousandths, is used. For grinding to close limits, a fine adjustment is available.

Variable table travel is provided by the Oilgear feed. The amount of crossfeed is also adjustable. The rate of travel varies from 0 to 55 ft. per minute.

Rates of automatic table travel for the Nos. 4 and 5 grinders respectively are: longitudinal, 26 and 38 in.; transverse feed 12 and 12; vertical movement of the wheelhead 13¾ in. for both. The maximum distance from the wheel to the table under a 10-in. wheel is 12¼ in. Both use a 5-hp. motor. Wheels 10 in. in diam. and having either ¾- or 1-in. face are used. Either machine may be equipped with a magnetic chuck having a working surface equal to the table area of the machine.

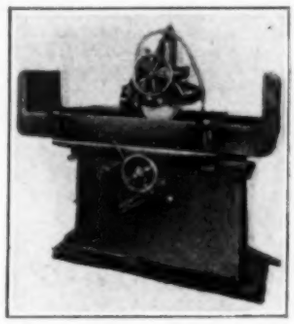
Weights, 4,025 and 4,250 lb., respectively.

— 41 —

Grinding Machine, Surface, Type F

Diamond Machine Co., Providence, R. I. [Vol.69,p.899]

Work 24 in. long, 12 in. wide and 12 in. high can be finished under a 12-in. wheel on the type F surface grinding machine. The guards are ad-



justable for the wear of the wheel, and can be removed quickly. Feeds are as follows: Cross, automatic, 0.005 to 0.111 in. per stroke; hand, 0.333 in. per rev. of the handwheel; vertical, 0.125 in. per rev. of the handwheel, the vertical distance being shown on a dial graduated in thousandths.

One-piece construction is used for the bed and column. The spindle, which is hardened and ground to size, rotates at 1,470 r.p.m. Both spindle and table are driven by a 5-hp. standard a.c. or d.c. motor. The table travel is ample to clear the work, and the speed of reciprocation is 29 ft. per min. Crossfeed may be either automatic at both ends of the table travel or by hand.

The length of the table travel is determined by adjustable dogs, but the table may be stopped instantly when desired. Hand and power feed cannot be engaged at the same time. The coolant is delivered through movable nozzles to the work at any point. A magnetic chuck can be furnished extra.

Bed length 52 in.; height of table 34¾ in.; floor space required 66x106 in. Shipping weight 5,300 pounds.

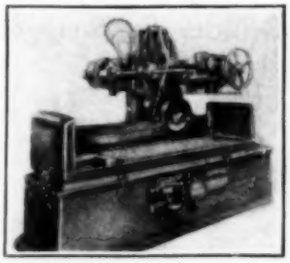
— 42 —

Grinding Machine, Surface, Type H

Diamond Machine Co., Providence, R. I. [Vol.69,p.939]

Two standard sizes of the Type H surface grinding machine are available to handle work 48x16x16 in., and 72x16x16 in. respectively. Extra-size machines can be furnished. The bed and table are independent of the head upright and cross-rail.

The bed casting is of nickel cast iron. Ball bearings are



used wherever possible. Table travel for the smaller machine is 60 in., while that for the larger is 84 inches.

Work is ground by means of a 12-in. wheel having a 1½-in. face, and a 1½-in hole, and running at 1,500 r.p.m. Cross feeds are 0.025, 0.050, 0.110, and 0.200 in. per stroke. Rapid traverse is 17¾ in. per min. Vertical feeds are 0.125, 0.25, 0.50, and 0.100 in. per stroke, and the rapid traverse is 8.8 in. per min. Power, cross, and elevating feeds cannot be engaged at the same time. Both cross and vertical feeds may be set by hand.

The spindle motor is rated at 5 hp., and operates on either a.c. or d.c. circuits. The oil pump is driven by a 2-hp. motor from either a.c. or d.c. circuits, while the coolant pump is driven by a ¼-hp. motor suitable for single-phase, 60-cycle, 110-volt circuits only. A coolant supply tank is cast integral with the bed.

Floor space is 154 or 202 in. long by 83 in. deep. Table height is 30 in.; shipping weight, 48-in. machine, 8,500 lb.; 72-in. machine, 9,500 lb. net.

— 43 —

Grinding Machines, Cylindrical, Improvements in Type A

Norton Co., Worcester, Mass. [Vol.69,p.667]

These improvements include an integral drum frame and wheelslide, an improved type of pump, steel wheelguards, and ball bearing wheel-feed mechanism. All but the last are so designed that they may be attached in the field.

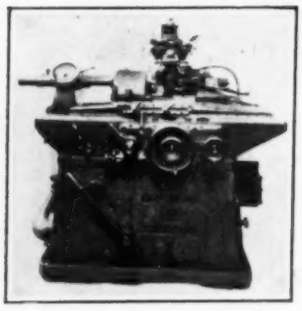
The wheel drum frame has been built to effect greater rigidity of the wheelhead. Ball bearings are used on the idler pulley and the wheel drum shaft. The wheelguards are made of steel plate either ⅜ or ⅞ in. thick, made in one-piece and riveted to a cast-steel adapter. The cover has the effect of a C-clamp and provides greater strength in case of wheel breakage. The pump is less complicated and more accessible. Ball bearings have been placed at both ends of the feed screw.

— 44 —

Grinding Machine, Thread, High-Precision, "Filor"

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol. 69,p.371]

Production grinding of accurate thread gages, taps, hardened worms, and micrometer screws, is the work of this



"Filor" machine. It is built by the Société Genevoise d'Instruments de Physique, Geneva, Switzerland. The machine is fully automatic in operation, and the feed can be stopped at any desired point. The maximum distance between centers is 12 in. The maximum diameter that can be ground with a new wheel is 3½ in., and with a badly worn wheel, 5 in. The machine grinds on the return motion, as well as on the forward travel.

The feed screw can be adjusted to any feed between 0.002 and 0.0002 in. The grinding wheel can be adjusted to 0.0005 in. Grinding wheel speeds are 92 to 99 ft. per sec. The wheel is trued by a single diamond. Finishing speeds for the work range from 2.6 to 12.8 r.p.m., while four roughing speeds from 9 to 46 r.p.m. are provided. Drive is through an overhead countershaft.

Dimensions, 5 ft. 11 in. by 5 ft. 6 in., by 4 ft. 11 in high. Weight 5,320 lb. net.

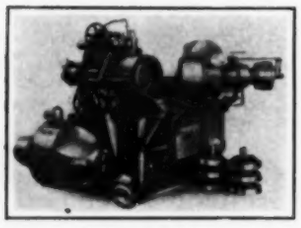
— 45 —

Grinder, Brake-Drum, Internal, 12-Inch

Cincinnati Grinders Incorporated, Cincinnati, Ohio. [Vol. 69,p.556]

Brake drums with an internal diameter up to 12 in. can be ground on this machine. Production is quoted at 60 drums per hour, floor-to-floor time.

The wheelhead is an integral part of the body. The grinding-wheel spindle, made of chrome-nickel steel, is driven



by means of a flexible chain. A pressure-feed system gives a continuous circulation of filtered oil. All major operations are accomplished by air pressure, including clamping of the work on the faceplate.

A 2-hp. constant-speed d.c. motor for the workhead is mounted on the swivel head, which is pivoted on the infeed side. Location of the drum is taken from the bore of the hub. Stock from 0.015 to 0.20 in. is removed in one operation. Micrometer adjustment is built into the infeed unit.

The grinding wheel is dressed by means of a rapid-type hand dresser. Power is supplied by a 20-hp. motor.

— 46 —

Grinding Machines, Cylinder, Models GA and MGBX

Hutto Engineering Co., 515 Lycaste Ave., Detroit, Mich. [Vol.69,p.667]

Model GA is a single-spindle machine, while model MGBX is a double-spindle grinder. In addition to grinding cylinders, these machines are adapted to the grinding of wrist-pin holes in pistons and connecting rods. Production for the single-spindle machine is said to be 125 pistons per hour.

The Model GA has a 3-hp.

motor, reduction gears, and stroking device, which imparts rotating and reciprocating motion to the spindle. The stroke may be varied from 0 to 7 in. The spindle rotates at 240 r.p.m., and reciprocates 70 times per minute.

The Model MGBX mechanism is driven by a horizontal worm shaft housed in the head of the machine pedestal and directly coupled to the electric motor. The spindle reciprocates 100 times per min., and rotates at 200 r.p.m. The stroke is variable from 0 to 3 in., and power is supplied by a 1-hp. motor.

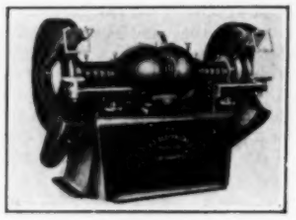
Floor space 18x32 in.; weight 253 lb., net.

— 47 —

Grinder and Snagger, "Hispeed"

U. S. Electrical Tool Co., Cincinnati, Ohio. [Vol.69,p.298]

The feature of this grinder is the wheel speed of 9,500 ft. per min., which is obtained when wheels 30 in. in diam. are operated from 40- or 60-cycle circuits. On 25- and 50-cycle



circuits, 24-in. wheels give speeds of 9,200 ft. per min. The machines for these frequencies are furnished to operate on 220-, 440-, and 550-volt, 2- or 3-phase a.c., and 220-volt d.c. circuits. The motor is rated at 15 hp. Wheels having 2½- or 3-in. faces are used for grinding.

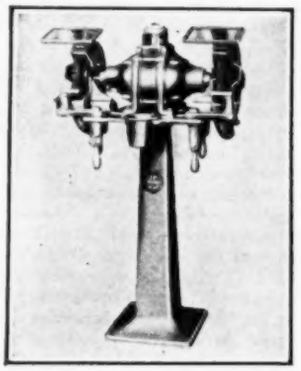
The wheel flanges are keyed to the shaft and clamped to the wheel by cap screws. Structural steel safety hoods are placed over the wheels. The double-ended shaft is made of nickel steel, and is mounted on four heavy-duty ball bearings in dustproof housings.

— 48 —

Grinder, "Auto Start"

U. S. Electrical Manufacturing Co., Los Angeles, Calif. [Vol.69,p.372]

Both pedestal and base types have been introduced. Features include transparent eye guards, sliding and adjustable toolrests, and the elimination of compensators or hand starters. The windings are completely in-



sulated with "Asbestosite," which prevents carbonization of the insulation. A simple adjustment gives the proper guard clearance regardless of the diameter of the wheels. The toolrests slide with the wheel-guards so that the same amount of clearance can be had regardless of the diameter of the wheels.

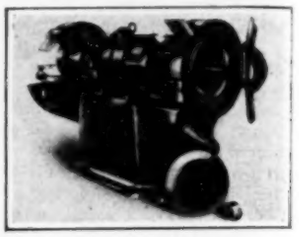
— 49 —

Grinder, Snagging, Heavy-Duty

Standard Electrical Tool Co., Cincinnati, Ohio. [Vol.69,p.599]

Rubber-bonded high-speed grinding wheels are used on these grinders, which are made in three sizes, 5, 7½, and 10 hp. The wheel flanges are 12 in. in diam., the inner flanges being keyed to the nickel steel armature shaft. This shaft runs in four SKF ball bearings mounted in dustproof chambers.

The emery-wheel guards are of the hinged-door type with ex-



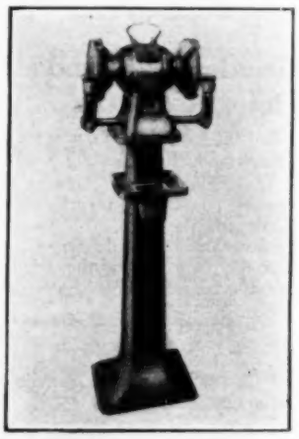
haust connections. The guards are fitted with spark breakers as well as polished wire-glass eye shields. Ring wheels from 20 to 30 in. in diam. are used.

— 50 —

Grinders, Bench

Stanley Works, New Britain, Conn. [Vol.69,p.709]

This bench grinder is designed especially for sharpening small tools. It is furnished with two 6-in. grinding wheels,



wheel guards, adjustable toolrests, cable, and switch. It is adaptable for use with wire brushes, and is provided with a handle for carrying. Circuits for which it is available are 110 volts at 25, 40, 50 and 60 cycles and 220 volts at 60 cycles. It is also furnished for d.c. at 115 or 230 volts. It can be mounted on floor stand, as shown.

Weight 43 lb., net.

— 51 —

Grinder, Floorstand, Multi-Purpose

J. G. Blount Co., Everett, Mass. [Vol.69,p.854]

Three wheels are provided on this machine. A course wheel 10x1½ in. is used for general shop work. A fine wheel of the same size is provided for the grinding of tools. The fine

wheel has a special rest, which is fully adjustable as to its angle with the wheel face. A special screw feed is fitted to the rest. For the grinding of gages and inside curved tools, a grinding cone is provided at the left-hand end as shown.

The machine is of the motor-in-head type, the spindle running in heavy-duty, deep-groove ball bearings. The wheels are fitted with fully-inclosing safety guards of an approved type, and are adjustable to wheel wear. The toolrests also are adjustable.

— 52 —

Grinders, Tool, Circular-Relief

Cleveland Tool Engineering Co., Main & 25th Sts., Cleveland, Ohio. [Vol.69,p.219]

On this machine, the outside face of the grinding wheel is dressed to the curve desired on the tool back of the cutting edge. The tool is offset from the wheel to give the desired clearance, after which it is ground in one operation. Such tools as reamers, milling cutters, boring heads and core drills can be handled.

The table, having a travel of 26 in., carries one adjustable and one fixed center rest. The adjustable center rest provides a frictionless scale-point center, a quick-acting spring-tension center, and a screw for raising the center used for grinding plain tapers. A screw graduated in ten-thousandths of an inch is used to elevate the table. The cross-slide screw is graduated

in thousands. A cam holder is placed at the front for any desired curve, angle, flat or back taper.

Floor space 2x6½ ft.; weight, 600 pounds.

— 53 —

Grinder, Hand, No. 4 "Dumore"

Wisconsin Electric Co., Racine, Wis. [Vol.69,p.483]

A wheel speed of 12,000 r.p.m. is used on this "Dumore" grinder. Wheels larger than 2½ in. should have an elastic or rubber bond, in which case it is possible to use a wheel as large as 3 in. in diam. The arbor on the shaft is fitted with spacing

collars so that emery wheels ranging from ⅜ to 1¼ in. thick can be used. A ¼-hp., ball-bearing, universal motor drives the spindle.

The emery wheel can be replaced with emery or sandpaper disks. A scratch brush can be used.

Length, 19½ in. overall. Weight, 12 pounds.

— 54 —

Grinders, Portable ½-Horsepower

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.69,p.751]

These portable grinders and buffers are equipped with ½-hp. motors for single- and three-phase a.c. or for d.c. circuits. All types use 6x1¼-in. wheels having ⅝-in. holes. The a.c.

machines operate at 3,425 r.p.m., while the d.c. types run at 3,550 r.p.m. Single-phase a.c. units, which are of the repulsion-induction type, operate on 110 and 220 volts, and the three-phase squirrel-cage model operates on 220 volts. D.C. models may be connected to 115- and 230-volt circuits.

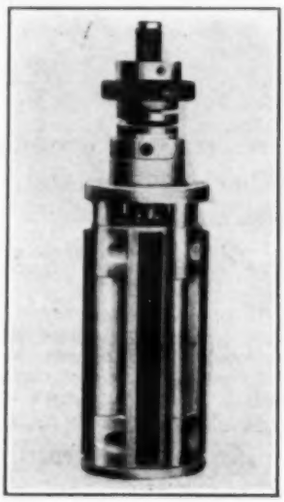
Weight with adjustable guard 42 lb., net.

— 55 —

Hone, Production, Model X

Hall Manufacturing Co., Toledo, Ohio. [Vol.69,p.74]

This tool is of the spring-pressure, positive-limit type. A micrometer adjusting ring lim-



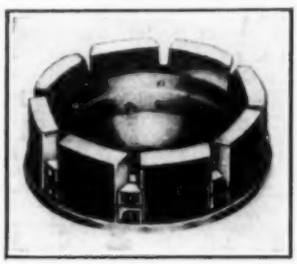
its the stop collar on the main shaft. Two floating cones expand the stone carriers when the spring pressure is increased. The tool is made in sizes from 2¼ to 3⅛ in. in diam., and will hone vertically at a speed of 22 ft. per min., and 50 to 80 up-and-down strokes per minute.

— 56 —

Chuck, Knife Grinding, Segmented

Samuel C. Rogers & Co., Buffalo, N. Y. [Vol.69,p.73]

This simple chuck is used on one of the knife grinders made by the above company, and may be applied to face and surface



grinders of other makes. It is made in five standard sizes, 12, 14, 16, 18, and 22 in., and can be furnished in larger sizes.

When the segments are worn half-way down, the outer wedges and the inner ring are removed, and the use of the wheel continued until the segments are completely used up. The weight of the 14-in. chuck is 60 pounds.

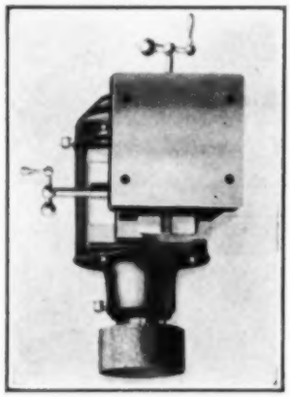
— 57 —

Grinding Attachments, Vertical-Spindle

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.69,p.336]

For thrust grinding with the spindle in the horizontal position or with the grinding wheel swung down at any angle, these vertical-spindle grinders are used. They can be furnished with a single, horizontal-slide adjustment, a single, vertical-slide adjustment, or a combination of the two. A grinder with the double-slide adjustment is shown.

The bearings are lubricated in an oil bath. When used in connection with a boring mill, many internal and surface grinding jobs can be done with toolroom accuracy, according to the man-



ufacturer. They are built in capacities of 1, 2, and 5 hp., and operate on 220- or 440-volt, 3-phase, a.c. circuits. The first two sizes operate at 3,500 r.p.m., and the last runs at 1,750 r.p.m. The first two sizes use 7x1-in. grinding wheels, and the last uses a 12x1½-in. wheel.

Models for d.c. circuits are available to run at 2,800 r.p.m. They use a 7x1-in. wheel, and take 3 hp. The weights of the a.c. models are 110, 140, and 280 lb., and the weight of the d.c. model is 290 pounds.

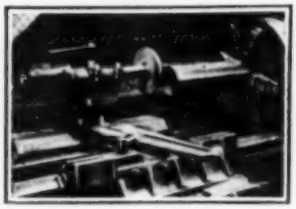
— 58 —

Grinder Attachment, Adjustable

Scully Steel & Iron Co., 2364 South Ashland Ave., Chicago, Ill. [Vol.69,p.483]

Both internal and external grinding can be performed with this device on a lathe, shaper, or milling machine. It is mounted on the adjustable base used to hold the Scully boring and turning bars described on page 373, Vol. 69, of the *American Machinist*.

The motor operates from a regular lamp socket. Four models are available, suitable for mounting the four sizes of



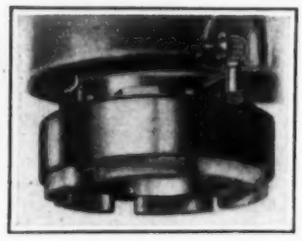
Scully adjustable boring bars. All models carry a 1-in. wheel for internal grinding, and a 4-in. wheel for external grinding. The standard length of the spindle housing is 8 in., and the depth which can be ground is 6 inches.

— 59 —

Grinding Wheel, Segment, for No. 16 Surface Grinder

Blanchard Machine Co., 64 State St., Cambridge, Mass. [Vol.69,p.555]

The segment wheel is intended for use on the No. 16 surface grinder manufactured by the above company. It consists of a chuck with six abrasive segments securely fastened in position by three clamping devices. The chuck body is machined from a solid steel forging, and is rust-proofed. Clamping units are made of aluminum bronze except for the screws, which are of stainless steel. The abrasive segments are made with rounded ends that match with the radius in the fixed abutments and in the self-aligning shoes of the clamping devices. The abrasive segments are 6 in. high when new and over 5 in. can be used.



The unit consists of one 18-in. segment wheel, a set of abrasive segments and wrench.

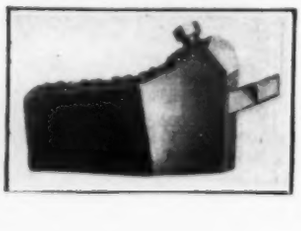
Weight 127 lb., net.

— 60 —

Grinding Fixture, Toolbit

Ready Tool Co., Bridgeport, Conn. [Vol.69,pp.519 and 827]

Any form of toolbit such as diamond point, threading tool, round nose, either right or left hand, can be ground by means of this device. Two sizes are available, one for $\frac{5}{8}$-in. and the other for $\frac{3}{4}$-in. square toolbits. The fixture has several machined faces at various angles. These faces are reference surfaces from which to get the angles desired in grinding the tool form.

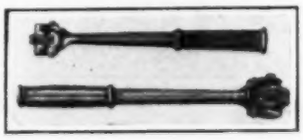


— 61 —

Dressers for Grinding Wheels Nos. 0 and 1, Special

Vincent Steel Process Co., 2519 Bellevue Ave., Detroit, Mich. [Vol.69,p.670]

These dressers are equipped with "Special" bushings with hardened shoulders against which the cutters ride. The regular type is 11 in. in length and



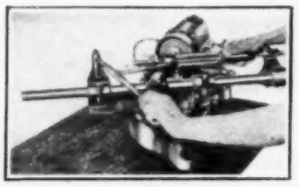
weighs 1¼ lb. The hooded dresser is also 11 in. in length and weighs 1⅞ lb. The device is intended for use with any No. 0 Huntington cutter.

— 62 —

Attachment, Reamer-Grinding

Black & Decker Manufacturing Co., Towson, Md. [Vol.69, p.1012]

Straight and taper reamers up to 5 in. in diam. by 14 in. overall length, and 7 in. length of blade, may be ground. The attachment is supplied complete with toolrest, gage for setting toolrest to correct height, and diamond holder for dressing the grinding wheel. It fits the ¾-, 1-, and 1½-in. valve refacers. A graduated micrometer taper attachment permits grinding taper reamers. The tapered entering



cutter found on many reamers can also be ground.

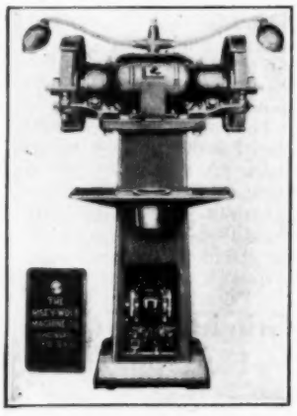
— 63 —

Grinder Attachments

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.69,p.981]

These two attachments, which can be placed on the standard line of grinders, are a treadle switch, which automatically shuts off the machine, and an automatic electric light control. The treadle extends the entire width of the column thus allowing simultaneous operation by two workmen.

The automatic lights burn only while the grinder is being used.



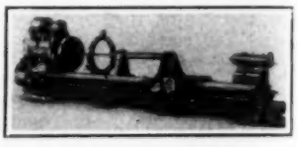
They operate automatically with the motor control switch. Flexible metal holders permit adjustment instantly to any desired position.

— 65 —

Lathe, Engine, with Boring Bar Attachment, 36-Inch by 22-Foot, "Time Saver"

Niles Tool Works Co., Div. of Niles Bement-Pond Co., Hamilton, Ohio. [Vol.69,p.256]

Large cylinder bushings for locomotives of foreign make are being turned, bored, and recessed on this standard lathe equipped with a boring bar attachment. The boring bar bracket is fastened to the wings of the carriage. It has an outer support



and a pilot bar carried in a bushing on the spindle nose. The end of the bar is fitted with a key to which a boring head is secured. A large center rest is also furnished.

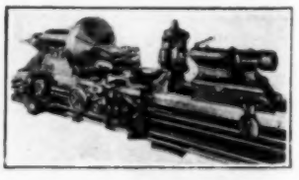
The bushings handled are about 40 in. long, with an outside diameter of 27½ in. and a bore of 25½ in. They are cast with a flange for chucking on the faceplate. After chucking, a light cut is taken to provide a bearing for the center rest.

— 66 —

Lathes, Engine, Motor-Driven, All-Geared, 42- and 48-Inch, "Low Drive"

Bradford Machine Tool Co., 657 Evans St., Cincinnati, Ohio. [Vol.69,p.853]

Complete redesign of these motor-driven lathes has resulted in machines of very heavy and powerful construction. About two-thirds of the drive is placed directly under the head and



down in the bed, where the six selective initial speed changes are controlled by a single lever. The head carries the backgear drive and a triple or faceplate drive in addition to the direct drive for the spindle. Eighteen forward and reverse spindle speeds from 1½ to 175 r.p.m. are provided.

Power rapid traverse by independent motor is available for the carriage and to operate the

Lathes

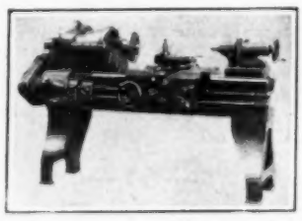
— 64 —

Lathe, Engine "Economy," 16-Inch

Rockford Machine Tool Co., Rockford, Ill. [Vol.69,p.175]

This cone-head-type lathe rated at 16-in., but having a 17¾-in. swing over the ways, has all sliding surfaces accurately scraped. The carriage has long bearings on the bed Vs, and the apron is designed with double walls providing two bearings for each shaft. All gears in the apron are of steel, and the compound is of heavy construction.

The "Economy" lathe has an individual lead screw for thread cutting and a feed shaft for turning. A simple control prevents interlocking of the two. The head is of the double-backgear type. The rigidly designed tailstock of the offset type permits of a wider range of work than the machine is rated for.



Crucible steel is used for the tailstock centers. All moving parts are completely guarded. Standard attachments are easily applied. The lathes are provided with oil wipers. They are painted in a new shade of blue-gray.

carriage cross-feed screw, the toolrest and the angular feed to the compound rest. Lubrication of all bearings is automatic. The apron with its gearing is designed so as to accommodate both the usual feeding and thread cutting motions as well as the power rapid traverse. Threads that can be cut range from 1 to 56 per in., and feeds range from 2 to 112 per in. Power is furnished by a 25-hp., constant-speed motor. The steadyrest has an opening 18½ in. in diam. with adjustable screw jaws.

— 67 —

Lathes, Engine, Geared-Head, Extra-Heavy-Duty

Wickes Bros., Saginaw, Mich. [Vol.69,p.1007]

Complete redesign and modernization has been effected for the 42,- 48,- and 60-in. extra-heavy-duty geared-head engine lathes manufactured by the above company. Unusually large members have been specified throughout, and ball or roller bearings have been used on all parts with the exception of the

main spindle bearings, which are bronze boxes lined with babbitt. The standard bed used with each size is 16 ft. 6 in., so that work 5 ft. 1 in. long may be taken between centers on all three sizes. Operating levers on the outside of the headstock provide for the selection of any one of sixteen individual speeds for the spindle. The minimum and maximum spindle speeds are 2 and 200 r.p.m. for every size.

Drive to the pulley may be either by belt with tightener, by chain, or by gearing. Power-driven longitudinal traverse for the carriage as well as power-driven cross traverse may be provided if desired.

The quick-change gearbox is a unit by itself, and is mounted on the front. Forty feed changes are provided, permitting screw cutting with from ½ to 14 threads per inch. The range of longitudinal feeds per revolution of the spindle varies from 0.24 to 0.723 in., while the range of cross feeds per rev. of the spindle varies from 0.009 to 0.271 inches.

The swing over the bed for the three sizes are 44, 51½ and 61 in., respectively. All sizes take maximum tool shanks of 2½ inches.

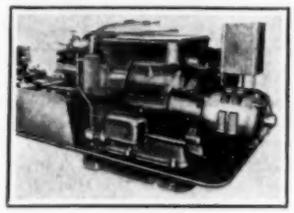
Weights, 41,000, 42,200, and 45,000 lb., respectively. Floor space required for all sizes is 6 ft. 3 in. by 18 ft. 4 inches.

— 68 —

Lathes, Turret, with Motor Drive

International Machine Tool Co., Indianapolis, Ind. [Vol.69, p.337]

Motor drive is now available for application to the Types H and CH turret lathes made by the above company. The Type H lathe was described on page 711, Vol. 67, and the Type CH on page 989, Vol. 68, of the *American Machinist*. A 20- or 25-hp., drum-type motor running at



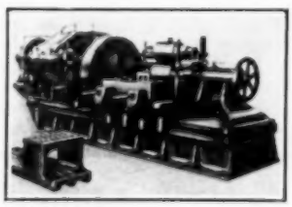
1,800 r.p.m. is used, and is connected to the drive shaft by means of a flexible coupling. This drive does not obstruct light on the work, and allows a clear view over the machine. A bracket to support a standard motor may be obtained, if desired.

— 69 —

Lathes, Roll,

Mackintosh - Hemphill Co., Pittsburgh, Pa. [Vol.69,p.334]

Both direct - motor - driven, heavy - duty roll lathes are equipped with roller bearings on all gear shafts. The 36-in. lathe shown has the motor mounted directly on the headstock. Two



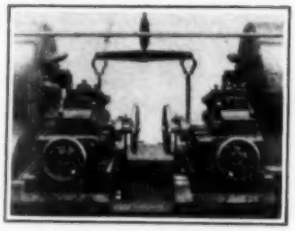
rolls 8 ft. 6 in. long and 36 in. in diam. can be turned simultaneously. The other lathe designed for rolls of longer length, operates at speeds ranging from 0.73 to 6.5 r.p.m. It will take a roll 31 in. in diam. A totally-inclosed headstock is featured.

— 70 —

Lathe Adapted to Roller Bearing Car Wheels, No. 4

Niles Tool Works Co., Div. of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.69,p.181]

Chucking of roller bearing car wheel sets for tire turning may be accomplished easily on



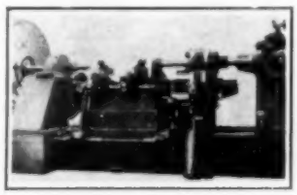
this machine. The wheels are mounted on centers in sliding spindles, and it is only necessary to remove the end cover plate of the roller bearing housing to expose the center in the axle. Each toolrest is mounted on a sub-base having a small amount of lateral adjustment by rack and pinion.

— 71 —

Lathe, Journal-Turning, 90-Inch, Improved

Niles Tool Works Co., Div. of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.69,p.177]

Crankpin turning and double quartering attachments have been added to this journal lathe. Where it is necessary to double quarter or turn the crank pins



of 3-cylinder locomotives having the cranks 120 deg. apart, the right-hand attachment is raised and tilted 30 deg., by means of a filler block.

Crankpin heads are of the box-tool type, and are mounted on heavy bases bolted to the bed, the right-hand head on the base to which the outside journal rest is attached, and the left-hand head on an independent base adjacent to the faceplate. The heads receive their rotation and lateral adjustment from the quartering-attachment spindles. The capacity of these attachments for engine stroke is the same as for the quartering attachments, namely, 22-in. minimum and 40-in. maximum stroke. Crankpin heads will turn pins from 7 to 12 in. in diam., accommodating pins of the maximum length.

Both journals on center crank axles for 3-cylinder locomotives may be turned at one setting by a special rest which has narrow slides. It has power longitudinal feed from the main feed shaft. Cross feed is by hand.

Another improvement is the use of steel wearing plates on the bed under the sliding heads. These plates are the means of preserving alignment.

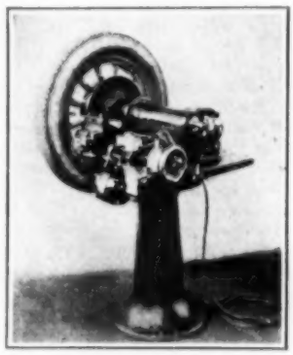
— 72 —

Lathe, Turning and Honing, Brake Drum

Reed - Prentice Corporation, Worcester, Mass. [Vol.69,p.374]

Brake drums can be turned in service stations on this lathe without removing the tire or rim. An outboard stand for supporting truck wheels is furnished. Wheels are applied to the machine by means of a taper arbor. Timken bearings are used on the spindle.

The spindle drive is through worm and worm gear running in oil, power being supplied by a ½-hp. motor suitable for 50- or



60-cycle, single-phase, 110- or 220-volt a.c. or 115- or 230-volt d.c. circuits. The toolslide is connected through a worm and worm gear to ½-hp. motor of similar voltage and current. Both motors are connected with a tumbler switch, which automatically controls the feed through an adjustable rod. A honing tool carrying two stones for internal and external drums may be supplied to fit into the tool block.

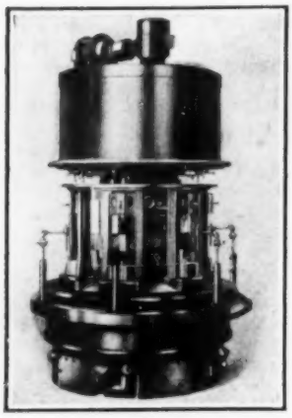
— 73 —

Lathe, Center, Mult-Au-Matic, 8-Inch

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.69,p.515]

This machine is a combination of five center lathes, highly refined as regards the possible combinations of feeds and speeds. The time of production of a piece of work is the time of performing the work on the longest operation.

Loading and unloading is done at the front while the work is being performed simultaneously at the other five stations. The lower center receives the thrust of the work radially on the center cone instead of perpendicularly to the axis. Each tailstock is adjustable in guides. The 8-in. Mult-Au-Matic has a capacity for work up to 4 in. in diam. and 12 in. between centers.



The general construction is the same as the standard type manufactured by the company.

The spindle speeds vary from 44 to 400 r.p.m. and the tool feeds range from 0.005 to 0.045 in. per revolution.

The upper part of the base of the machine forms the oil reservoir, while the cutting compound is stored in the lower part. Drive is by means of a 10-hp. motor located on the top of the machine.

Floor space 77 in. in diam., plus a chip container 15x29 in. Height, not including the motor, 128 inches.

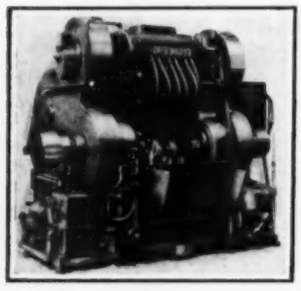
— 74 —

Lathe, Crankpin-Turning, Automatic

R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. [Vol.69, p.1008]

Cheeking the webs and turning all pins to the grinding size in one operation can be done on this machine. The crankshafts used are previously finish turned on a similar machine on the flange and front ends and the centerline bearings are rough ground.

The crankshaft is driven from both ends by heavy air-operated



pot chucks. Each centerline bearing is supported by a heavy steadyrest of the full-bearing type. The crankshaft rotates about the centerline bearings as an axis, and the tools for cheeking and turning the pins follow the movement of the throws. The movements of the tools are controlled by two master crankshafts located above and below the work. The toolslides are arranged so that the tools feed into the work from opposite directions, thus preventing deflection of the work. Vertical bit-type tools are used, thus making it possible to remove them for grinding and replacement.

Drive is by means of a direct-connected, 30-hp. a.c. motor. An electric dynamic brake is used to stop the spindle in any predetermined position.

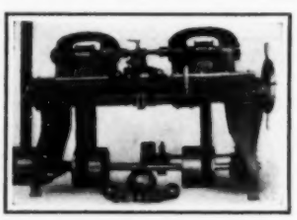
Lubricant is supplied to the slides and bearings by means of an automatic lubricator mounted on the top. The normal production generally averages between 20 and 30 finished crankshafts per hour.

— 75 —

Lathe, Ball-Turning

James M. Smith Co., 203 Main St., Seymour, Conn. [Vol. 69,p.1009]

Balls from 2½ to 9 in. in diam. can be turned. The machine illustrated is belt-driven. Both spindles run at the same speed, 450 to 800 r.p.m., depending on



the material and the size of the ball. Power is delivered to them from the main drive shaft by belt. Friction chucks are tightened by the spoked handwheel at the right-hand end. The power-feed mechanism is actuated by power transmitted from the main drive shaft to the jackshaft at the rear, and thence up to the machine proper. The carriage is adjusted by the handle at the extreme left. The feed is entirely automatic, the tool swiveling about the work. Timken bearings are used on the spindles.

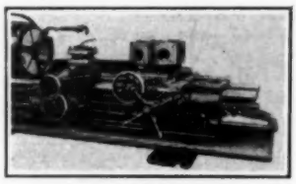
— 76 —

Turret, Cross-Sliding, for "Libby-International" Lathes

International Machine Tool Co., Indianapolis, Ind. [Vol.69, p.221]

The application of the cross-sliding turret makes the above lathes suitable for either quantity or small-lot production. Heavy, gibbed tri-way bearings and the turret slide made in one piece over and under the back way insure rigidity. The tri-way bearings are adjustable for wear, and a long taper gib runs the entire length of the slide. The turret has independent power cross and longitudinal feeds. These are independent of the quick traverse or of the toolpost carriage travel. Automatic trip-offs for the cross-feed are provided.

Both the toolpost and turret carriages are provided with large dials for measurement of



the longitudinal and cross-feeds. The bottom slide is provided with a scale to show the exact position of the turret head in relation to the spindle. A heavy taper attachment for the turret is included.

Five sizes of these lathes are made. The smallest size will swing work 22½x24 in., and the largest 30x32 in. The smallest size will accommodate a 3½- or 5-in. spindle bore, while the largest will take 8¼-, 10½- or 12½-in. bores.

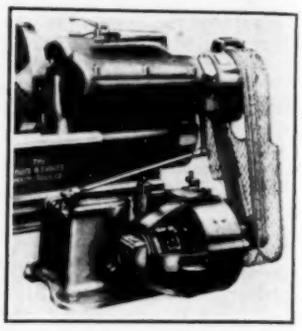
— 77 —

Drive for Lathes, "Texrope"

Boye & Emmes Machine Tool Co., Cincinnati, Ohio. [Vol.69, p.259]

All sizes of motor-driven engine lathes manufactured by the above company may now be equipped with a "Texrope" drive. The motor is mounted at the rear of the pedestal, and has vertical adjustments to secure the proper tension of the Texropes. A wire-mesh guard protects the pulley and belt.

Some of the advantages claimed for this drive are: Smooth operation, efficient operation on short centers, practical elimination of slip, and easy replacement.

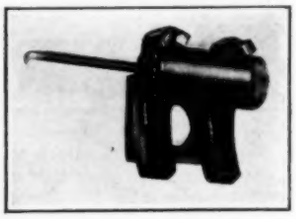


— 78 —

Lathe Attachment, Boring and Turning Bars, Adjustable

Scully Steel & Iron Co., 2364 South Ashland Ave., Chicago, Ill. [Vol.69,p.373]

In addition to boring and turning, internal or external threading may be performed with these bars. They are intended for use in holders, which are built in five sizes. The bars range from ¾ to 3 in. in diam., and from 14



to 30 in. in length. They are double-ended, and take cutters ¾ to ⅝ in. in thickness. The smaller tools are made in sizes from ¼ to ⅝ in. in diam., and 6 to 8 in. in length.

The two small holders may be attached directly to the toolpost of the lathe.

Milling Machines

— 79 —

Milling Machines, Manufacturing, Special, No. 1

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.69, p.522]

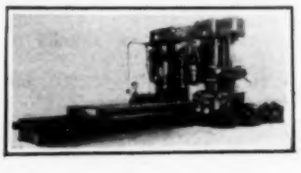
Quick-change or pick-off feed gears are now optional equipment on the manufacturing-type, knee and column milling machines manufactured by the above company. The No. 1 model has power feed to the table in the longitudinal direction only. Cross and vertical movements are by hand.

— 80 —

Milling Machine, Planer Type, 64x60-Inch

Wm. Sellers & Co., Inc., Philadelphia, Pa. [Vol.69,p.701]

A line of planer-type milling machines of various sizes has been brought out. The machine



shown will take work 64 in. wide between the cutters and the side head, 60 in. between the cutters and the crossrail head, and will mill work 20 ft. long. The heads on the crossrail and the two heads on the upright are identical, except that they may be right- and left-hand. Each head is driven by means of a 20-hp. motor.

The spindle quill has a 14-in. stroke by power or by hand. The feed for the head is by means of an independent motor with speed-reducing box. All feeds from 1 to 4 in. or 4 to 16 in. are controlled by means of the motor field rheostat. The table feed has an independent motor and gear unit providing feeds ranging from 1 to 16 in. per min., and rapid traverse at 20 ft. per minute.

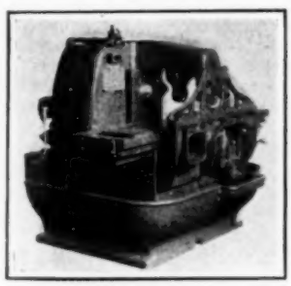
Each head has its own pump and circulating system. All motors are controlled from one panel, and are operated by push buttons located on both sides of the table. Interlocking devices are provided for the various motions.

— 81 —

Milling Machine, "DeVlieg Supermil"

Walcott Machine Co., Jackson, Mich. [Vol.69,p.1020]

Although designed for mass-production milling, the "DeVlieg Supermil" has advantages when the plain milling of small lots is considered, particularly when high accuracy and heavy cuts are necessary. Some of the principal features are: tool-steel table ways, hardened and ground; a new type of gib construction providing steadiness of the table during heavy cuts; and a large



feedscrew of alloy-steel, having a special thread form, hardened, ground, and lapped. Backlash is eliminated by the combination of a special device with the feedscrew. Thus it is possible to feed the work with and against the cutter and obtain a uniform thickness of chip per tooth, and also use climb cutting for work within the range of the machine.

Other features are automatic flood lubrication, Timken bearings, large chip pan and coolant system, truss-type overarm, flange-type motor drive, ground-tooth gears, splined shafts, and great rigidity.

The main drive unit is self-contained, pick-off gears providing spindle speeds from 20 to 180 r.p.m. Power feeds range from 1.8 to 21 in. per min. in either direction, and power rapid traverse of 180 in. per min. in either direction is provided.

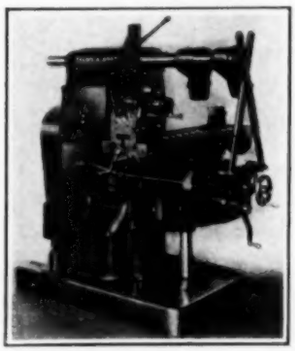
The table width is 16 in., and is furnished with varying lengths of feed, namely, 24, 30, 36 and 42 in. The spindle is adjustable vertically to a minimum distance of 2 and a maximum of 14 in., from its center to the top of the table.

— 82 —

Milling Machines, Knee-Type "Standard," Nos. 1A and 1B

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.69,p.369]

Slightly smaller capacity is found in these sizes than in the Nos. 2A and 3A universal and



2B and 3B plain, described on page 35, Vol. 68, of the *American Machinist*. Neither style is equipped with power fast travel, dual control for changes of the feed, nor pump, although either machine can be furnished with power fast travel and the pump. They are provided with an automatic longitudinal and transverse table feed. Vertical feed for the table is by hand.

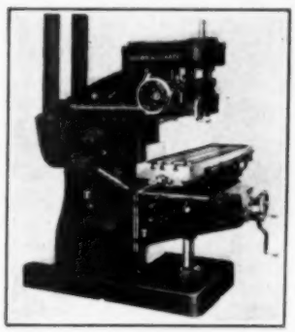
The knee may be clamped from either the front or rear. The driving clutch is of the multiple-disk dry type. A pump delivers oil to all mechanisms within the column and to the driving pulley. The knee mechanism is also provided with a pump. These machines are equipped for belt or motor drive.

— 83 —

Milling Machine, Knee-Type, "Standard," No. 2

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.69,p.413]

Dual control for feed changes has been incorporated in this machine, which is an addition to the "Standard" line. Operating



positions are provided at the front and at the rear. Speed changes in two series are made by a single lever. Power fast travel for longitudinal, transverse, and vertical movements is controlled by a single lever.

Automatic disengagement of the power fast travel occurs with simultaneous engagement of the cutting speed and automatic feed. Likewise an automatic release is provided for the spindle. The spindle head is provided with a micrometer stop for controlling the depth of the cut. Filtered oil is provided by an automatic lubrication system to all mechanisms in the column. A separate pump provides lubrication to the knee assembly.

The machine is equipped for belt drive, but it can be fitted for or equipped with a motor.

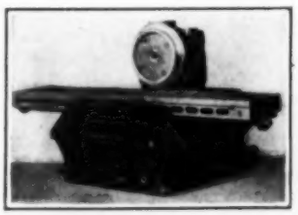
— 84 —

Milling Machines, "Broadside"

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.69, p.859]

By replacing the standard face-milling heads with special heads, both the "Simplex" and the "Duplex" Mil-Waukee-Mils have been converted to the "Broadside" milling machines. In the case of the Duplex model, one head may be standard and the other special if desired. Power feeds from 3 to 11 ft. per min. may be obtained for either model, and the widths of the table may be either 14 or 22 inches.

Cutters up to 24 in. can be



mounted on the faceplate. The spindle position is fixed in relation to the table. The head is fitted with a standardized spindle nose and cutters of the larger diameters are driven by clutch keyways, with the cutters held to the faceplate by means of bolts. The clutch in the standardized spindle will take care of cutters of the smaller diameters. Flywheels are placed on the main drive pinion shaft and the auxiliary shaft to provide a smooth flow of power.

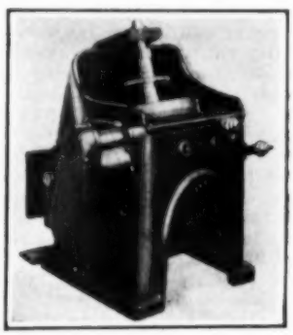
The "Broadside" head is equipped with pick-off gears giving spindle speeds of 6 to 51 r.p.m. It has eighteen changes of feed. A 15-hp. motor is required.

— 85 —

Milling Machine, Offset, Tilted, 28-Inch

Oesterlein Machine Co., Cincinnati, Ohio. [Vol.69,p.671]

This 28-in. machine is intended for the milling of screws and bolts, and work such as flatting the heads of connecting rod bolts, and straddle and face milling. It is similar in design to the 48-in. machine described on page 377, Vol. 67, of the *American Machinist*. The principle is the same, in that relatively large cutters are completely surrounded with work, and the rotational centers of the



work and the cutters are offset from each other to obtain the proper depth of cut. Cutting is continuous, there being no returning to the starting point. Many parts are cut at once.

The machine has a table 18 in. in diam. and swings work 28 in. in diam. The distance from the table to the outboard arbor bearing is 14 in. The machine is driven by a 3-hp. motor.

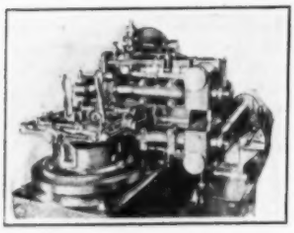
Weight 2,600 pounds.

— 86 —

Milling Machine, Opposed-Feed, Double-Spindle, Special-Purpose No. 50, Producto-Matic

Producto Machine Co., Bridgeport, Conn. [Vol.69,p.559]

Two cutter spindles with opposed "scissor type" feed are used on this machine, which is



designed for the side milling of automobile connecting rods and slitting the caps from the rod. By changing the fixtures, however, it can be used for any job that is to be milled on both sides at one time.

The cabinet base, bed and indexing table are the same as on the standard Producto-Matic machine. The top spindle is operated by a feed lever and feeds downward. It is driven from a heavy cam on the main camshaft at the rear. Adjustable rollers are provided at both ends of the feed lever, and the spindle slide is held up against the front roller by three heavy springs in order to insure smooth action. The lower spindle is fed upward in the same manner. The cams operating the levers can be changed to give different lengths of stroke for different jobs.

The ram carrying the two spindle blocks feeds outwards, and is operated by a large internal cam at the left. Each spindle is driven through a worm gear and worm. Various spindle speeds can be obtained by changing the gears. The spindles are reversed by a lever movement at the gear box. They can be adjusted vertically and horizontally.

Roller and ball bearings are used throughout at all important points. Lubrication of the transmission is automatic. Other bearings and slides have sight-feed oilers.

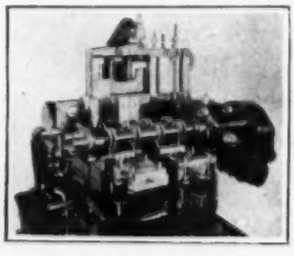
— 87 —

Tap Squaring Machine, Producto-Matic

Producto Machine Co., Bridgeport, Conn. [Vol.69,p.749]

Four taps may be squared at a time on this automatic machine, which will take taps from ¼ to 1½ in. The production for ½-in. taps is 1,000 per hour, while that for 1½-in. taps is 300 per hour.

The work table is the same as



for the standard Producto-Matic machine. Four fixtures are located on the table, each fixture taking four taps. The taps are first straddle milled on two sides and the table is then indexed one-quarter turn to the second position, where the taps are squared on the other two sides.

The machine has a standard Producto-Matic cabinet base and bed and standard cutter feed drive. The cutter block is adjustable horizontally, and is equipped with two spindles, which lie in the same plane, and are adjustable independently of each other. The machine will feed the spindle either vertically or horizontally, or in both directions at one time. The indexing is carried out by a lever action from cams on the rear camshaft.

Drive is by a 7½-hp. motor. Automatic force-feed lubrication is used for the transmission, and the spindle bearings and slides have sight-feed oilers. Roller and ball bearings are used at all important points.

— 88 —

Keyway-Cutting Machine, No. 25, Producto-Matic

Producto Machine Co., Bridgeport, Conn. [Vol.69,p.902]

An adaptation of the Producto-Matic to the automatic cutting of the keyways in automobile axles has been made. The operator loads and unloads the axles during the cutting cycle and the only time lost is for indexing. The rated pro-

duction of the machine with one operator is 200 to 225 axles per hour.

The base is the same as for the standard Producto-Matic, but the front of the bed has been cut off to permit the installation of the horizontal fixture. The camshaft drive and the cutter spindle drive are standard also. Changes in speed are made through pick-off gears in the drive boxes, as described on page 559, Vol. 69, of the *American Machinist*. The ram and slides are mounted at the rear. The head and fixture are entirely special, the fixture being designed to accommodate 24 axles. Ball and roller bearings are employed throughout, except for the cutter spindle which has bronze taper take-up type. Force-feed lubrication is provided, with sight-feed oilers on the spindle bearings and slides. The machine is driven by a 10-hp. motor.

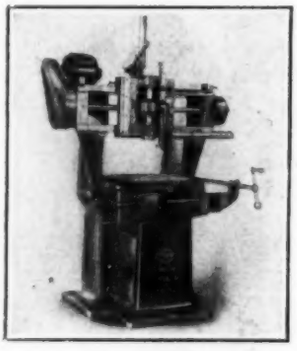
— 89 —

Profiling and Milling Machine, No. 6

Frew Machine Co., 124 West Venango St., Philadelphia, Pa. [Vol.69,p.517]

Both profiling and vertical milling can be performed on this machine. Speed of the pulley drive shaft is 300 r.p.m. A 3-hp. motor is used. Pick-off gears give six spindle speeds ranging from 150 to 840 r.p.m. A hand lever controls the vertical motion of 4 in. on the spindle.

The movement of the cross-slide is 27 in. Distance between uprights is 25½ in., while the



height between the table and the cross-slide is 11¼ in. The longitudinal movement of 24 in. on the table is effected by a hand crank. Four T-slots are provided in the table, which is 24x20¾ inches.

The slide is bored for two pins so that a master form can be made by using a sample piece in the work position. These machines can be furnished with one or two spindles.

Floor space, single-spindle machine, 60x48 in.; weight, 2,800 pounds.

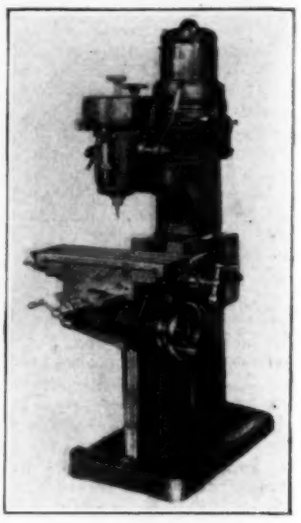
— 90 —

Milling and Routing Machine, No. 8-D

George Gorton Machine Co., Racine, Wis. [Vol.69,p.825]

Die work and routing in brass, steel and cast iron can be handled. Ten spindle speeds, ranging from 475 to 3,000 r.p.m. are obtainable. Higher speeds up to 6,000 r.p.m. are available for brass routing. The machine will drive ½-in. high-speed steel cutters. Vertical movement of the spindle on machines equipped for brass routing is effected by means of a treadle not shown.

The sliding head, when close to the column, permits a gap between the column and the spindle of 15 in., whereas when



fully extended the gap is 30 in. The table traverses 22 in., and the area of the working surface is 15x22 in. The maximum distance between the spindle and the table is 15 in., and the minimum is 0 in. For brass routing, the machine is equipped with a chip blower integral with the motor, and a forming attachment for cutting curved surfaces.

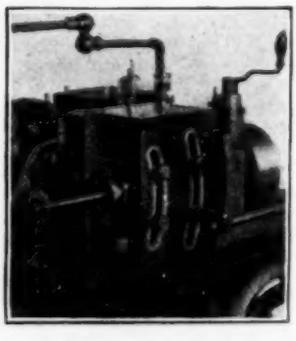
— 91 —

Milling Head, Internal, for Model B Thread Millers

Pratt & Whitney Co., Div. of the Niles-Bement-Pond Co., Hartford, Conn. [Vol.69,p.448]

This milling head, designed for internal milling and hobbing, may be applied to either the 6- or 10-in. Model "B" thread millers made by the above company. The head is geared so that the speed of the internal cutter spindle is double that of the external cutter spindle. The base dovetails on to the cross-slide of the external cutter head.

Power is supplied to the internal head through two intermediate gears to a gear mounted on the cutter spindle. The spindle of the internal head is mounted in bronze bearings, and is equipped with a flywheel. An adjustment is provided for set-



ting the cutter at any angle up to 10 deg., above or below the center line.

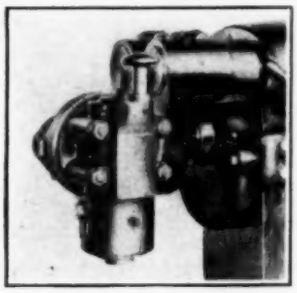
— 92 —

Milling Attachments, Vertical-Spindle, High-Speed

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.69,p.905]

Three vertical-spindle milling attachments, designed especially for high-speed work, have been developed. The features are convenience of control, accuracy, and facility of application to constant-speed-drive, horizontal-spindle milling machines. Anti-friction bearings are used on the high-speed spindles.

The No. 10 plain attachment is designed particularly for manufacturing jobs, where it is desirable to raise the spindle to clear the cutter from the work



in order to facilitate loading. The spindle has a hand adjustment of 2½ in. The No. 10 compound attachment is similar in design to the regular type. The spindle may be set in a plane at right angles to the table for milling angular strips and table ways. Full universal movement of the No. 10 universal attachment affords a means for drilling, milling angular slots and surfaces, cutting racks, and milling dies, molds, and other toolwork. It has a hand feed adjustment of 1¼ inch.

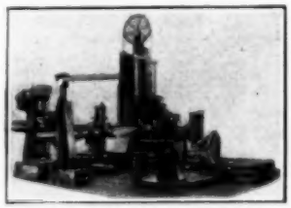
Planers and Shapers

— 93 —

Planing and Boring Machine, Locomotive-Cylinder, Traveling-Head, 72-Inch

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol. 69,p.863]

Continuous machining operations on locomotive cylinders, such as planing, boring and milling, can be done on this machine, which is equipped with a piston-valve boring unit. When operating as a planer, it can feed either horizontally on the bed or vertically on the column.



It is provided with automatic feeds for the ram. Eight changes of feed in either direction are given. All boring and milling feeds are started and stopped by one lever. All motions have rapid power traverse.

The machine has a stroke of 72 in., vertical feed of 96 in., and horizontal feed of 18 ft. A 10-hp., reversing-type motor is used. The floor plate is made in two sections and measures approximately 15x20 ft. The horizontal piston-valve boring machine has an automatic feed of 14 in. horizontally, with six feed changes. It has 44 in. of vertical adjustment and 24 in. of horizontal adjustment. The unit is driven by a 7½-hp., direct-connected motor.

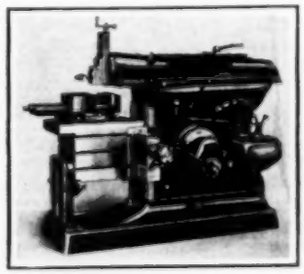
— 94 —

Shapers, Crank, Back-Geared, High-Speed, Improved, 16-, 20-, and 25-Inch

Smith & Mills Co., Cincinnati, Ohio. [Vol.69,p.372]

A V-type ram and a support holding the table rigid at extreme elevation are the principal improvements. The ram has 55-deg. V-ways, and is of cap-and-gib, one-piece construction for the full length, with a single horizontal adjustment for wear. The ram carrier has been lengthened and screw adjustment provided so that the ram can be positioned while in motion. The 25-in. shaper was described on page 410, Vol. 67, of the *American Machinist*.

Automatic vertical and horizontal table feed in either direction is provided. All feed gears are of steel, and a solid feed rod is provided. This rod has a feed disk containing 15 notches. Each notch corresponds to 0.010 in. feed.



The gearbox is driven through a twin-disk clutch by a single pulley mounted on tapered roller bearings. Motor drive can be furnished if desired.

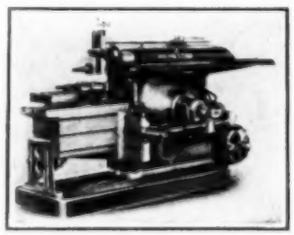
— 95 —

Shaper, Crank, Rapid-Traverse, 36-Inch

Cincinnati Shaper Co., Cincinnati, Ohio. [Vol.69,p.555]

Rapid traverse is the chief feature of this 36-in. shaper. All features common to the line manufactured by the above company are incorporated. These include automatic oiling, full-length taper gibs, selective multiple-cam feed, and internal transmission.

The length of stroke is 36½ in., and the strokes per minute



range from 8 to 102. The largest tool that can be used is 1x2 in. Eight cutting speeds are provided. The feed depth of the head is 9 in., while the cross feeds range from 0.010 to 0.170 in. per stroke. Horizontal table travel is 20½ in. while the vertical travel is 13 inches.

The table top is 16x36 in., and the depth is 20 in. Either belt- or motor-driven types are available. The motor-driven machine requires a 10-hp. motor of the constant-speed type, running at 1,800 rev. per minute.

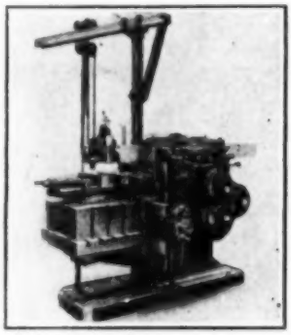
Floor space, 12 ft. 1 in. by 5 ft. 2 in. Weight, belt-driven type, 7,400 lb.; motor-driven machine, 7,900 lb. net.

— 96 —

Shaper, Draw-Cut, High-Duty, 32-Inch

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol. 69,p.516]

Heavy construction of the box-type column is the chief feature of this draw-cut shaper which has a 32-in. cutting



stroke, 32-in. horizontal feed on the table, and a 16-in. vertical table feed. It is equipped with an independent crane and ½-ton hoist of the two-speed type. The steel swivel-base vise opens to 14 in., and the large T-slotted top plate is 28x32 inches.

The outer support carries the lower table. It is adjusted automatically, and is raised and lowered by screws. Two independent vertical feed screws are used.

The ram is made from a high-carbon steel forging, and is threaded to receive the cutting tool. The friction feed is of the automatic relieving type.

Power rapid traverse is standard construction. The splash system of oiling is used. Shell planing, shoe and wedge, and rod brass attachments are extra.

Presses

— 97 —

Press, Punch, Power, Bench, "Emco" W

Cleveland Planer Co., 3148 Superior Ave., N.E., Cleveland, Ohio. [Vol.69,p.668]

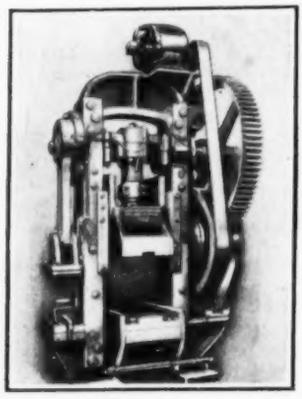
The good will, patents, drawings, patterns, jigs, fixtures, and the rights to manufacture and sell the "Emco W" bench power punch press, formerly built by the Enterprise Machine Tool Co., Chicago, Ill., have been acquired by the above company. It is the intention of the purchaser to build these machines in quantity so that they may be carried in stock for prompt shipment. Repair parts can be furnished also.

— 98 —

Press, Punch, Steel-Side

Chambersburg Engineering Co., Chambersburg, Pa. [Vol. 69,p.707]

Forged steel side frames have been built into this press. The hazard of press operation is minimized by the friction-slip flywheel. Roller bearings are used on all auxiliary shafts. Renewable clutch jaws and cams



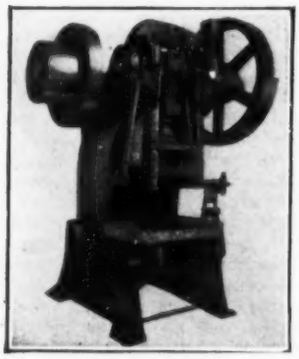
are provided, as well as high-pressure grease lubrication to all bearings. This press is supplied in either single- or double-crank construction.

— 99 —

Presses, Inclinable, Model R

Rockford Iron Works, Rockford, Ill. [Vol.69,p.783]

Eight sizes of inclinable presses, each made in either the flywheel or single-geared type, have been added to the line manufactured by the above company. The crankshafts for all models are heavy in design, heat-treated, and operate in bronze-bushed bearings. Crank-pin bearings are also bronze



bushed. The connection screw is heat-treated.

Anti-friction bearings are used for the backshafts.

All models can be operated in either the vertical or inclined positions. Lubrication is by oil or grease, and may be either plain or automatic as specified.

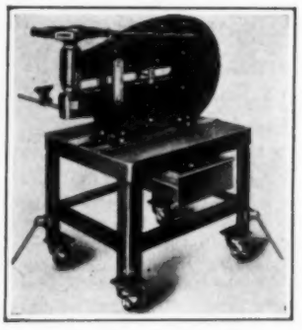
— 100 —

Presses, Punch, Hand-Operated, Deep-Throat, Truck-Mounted, Nos. 26 and 27

Whitney Metal Tool Co., Rockford, Ill. [Vol.69,p.479]

Both presses are mounted upon small truck-type bases. The No. 26 has an 18-in. throat depth, while that of the No. 27 is 24 in. The No. 26 will punch 2-in. holes through $\frac{3}{32}$-in. plate, while the No. 27 will punch 2-in. holes through 16 gage. Both machines are equipped with side tierod plates, so that $\frac{1}{2}$-in. holes may be punched through $\frac{3}{8}$-in. iron with a 7-in. throat clearance.

The die-holder is of such construction that bolster plates may be furnished when special dies



are required. A solid punch coupler can be used for holes up to 1 in., but over this size a split coupler is required, although it can be used for all sizes if desired. Two gages are furnished with each machine, one for depth and the other a side gage. The trucks are made of 3x3x$\frac{1}{4}$-in. angle iron, and are supplied with steel drawers.

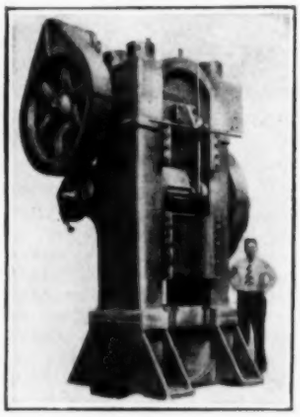
— 101 —

Press, Coining, 1,000-Ton

Ferracute Machine Co., Bridgeton, N. J. [Vol.69,p. 1010]

An upper-toggle coining press capable of exerting 1,000-tons pressure, has been added to the line manufactured by the above company. The tensile stresses are taken by four vertical steel rods shrunk in the columns. The steel toggle links are bronze bushed and the toggle pins are of hardened and ground steel. A steel casting, bronze bushed, is used for the pitman.

The vertical adjustment of the ram is obtained by means of a horizontal wedge. Bronze bushings are used for all bear-



ings on the main and backshafts. The press is equipped with a jaw clutch, and the ram has a knock-out. Forced lubrication is used throughout. The press illustrated has a distance between columns of 32 in., and the depth of bed, front-to-back is 36 in. Height from the bed to the ram at the top of the stroke and adjustment is 20$\frac{1}{2}$ in. This height is subject to change. Direct-motor drive gives 30 strokes per minute.

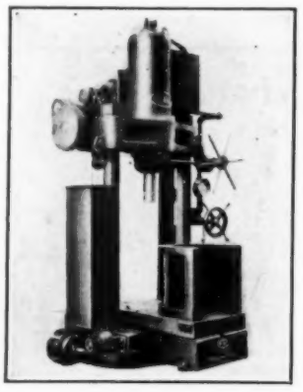
Weight 80,000 lb., net.

— 102 —

Press, Bushing, 100-Ton

Niles Tool Works Co., Div. of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.69,p.257]

Pressing bushings in and out of driving boxes is the function of this press. It is equipped



with a special motor-driven table having in and out adjustment. The sliding table is mounted directly on the base-plate. A heavy U-shaped cast-iron block, which is removable, is used for supporting the driving boxes.

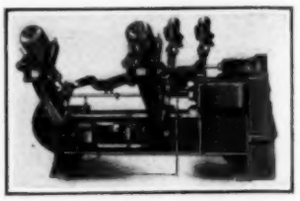
The traversing motor has a push-button control with suitable limit switches. It is connected to the table by worm gearing. Hydraulic power for pressing bushings is furnished by a two-plunger pump driven by a 7$\frac{1}{2}$-hp. motor. Bushings up to 20 in. in length can be handled as the ram stroke is 24 in. The width between the tension bars is 34 in., and the maximum height between the sliding table and the ram is 43$\frac{1}{2}$ inches.

— 103 —

Press, Assembly, Chassis-Frame

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.69,p.521]

Tubular cross-members can be pressed into the horns or outriggers, which have been previously rivetted to the side bar channel webs of chassis frames, by this pneumatic frame



assembly press. The press rams open wide to permit quick loading of frame parts. They advance rapidly in unison until they engage the side bar channel, when the speed is reduced automatically. They stop automatically when the side bar channels are properly spaced.

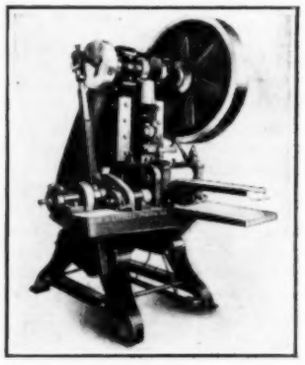
Standard drillheads, equipped with automatic feed and quick return, are used to drill the holes for the rivets which hold the cross members in place. The machine is a self-contained unit equipped with motor drive, and includes limit-switch controls, drilling-compound pump and sump, and pressure-pump lubrication of the mechanism.

— 104 —

Feed for Punch Presses, Single, No. 4A

F. J. Littell Machine Co., 4125 Ravenswood Ave., Chicago, Ill. [Vol.69,p.520]

This feed will handle stock up to 8$\frac{1}{4}$ in. in width, and will feed up to 28 in. in length. On



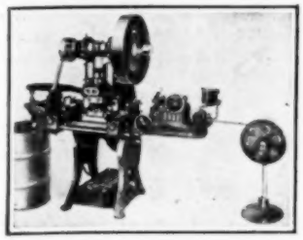
test it showed a variation of less than $\frac{1}{32}$ in. in 28 in., when tested for accuracy of feeding. It is of the front-to-back type with rack and pinion feed. The device can be used on straight-sided or double-crank presses, particularly on jobs where the stock is cut to size.

— 105 —

Straighteners for Punch Presses, Nos. 2 and 3

F. J. Littell Machine Co., 4125 Ravenswood Ave., Chicago, Ill. [Vol.69,p.222]

Springy stock may be straightened by means of these two devices. The No. 2



straightener is arranged with a hand-driven feeding mechanism. The apparatus may be supplied with an oiler if desired. It has nine rolls that will accommodate stock 3½ in. in width. The No. 3 size is similar to the No. 2, except that it has seven rolls and will accommodate stock up to 5 in. in width.

Shearing and Punching Machines

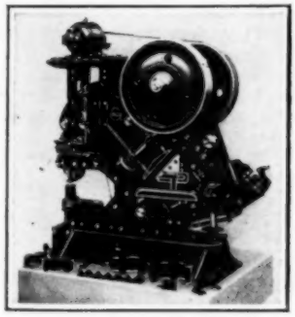
— 106 —

Punch, Shear, and Coper, Combined, Type M A E, Nos. 13 and 16

Henry Pels & Co., Inc., 90 West St., New York, N. Y. [Vol.69,p.1022]

Punching, slitting, angle and bar cutting, and coping can be done on the Nos. 13 and 16 type M A E multi-purpose shears. The machines make 40 and 36 strokes per min., respectively. The depths of stroke are 12 and 20 in. Holes ⅞ and 1⅛ in. can be punched through ¾-in. plate by the respective machines.

Slitting shears of the two machines are 10½ in. and 12 in. long, the lengths of strokes being 1⅜ and 1 7/16 in. Legs of angles can be trimmed, because



of the high plate throat construction and the hold-down operated by a worm gear. Each of the interchangeable and reversible knives has four cutting edges. Plates of any width ½ and ⅜ in. thick, respectively, can be sheared on the two sizes.

Maximum sizes of angles which can be cut square or on the bevel, four ways are 5x4x⅜, and 6x4x⅜ in., respectively. Rounds, squares and Ts can also be cut without changing the knives. Bevels up to 45 deg. can be cut on angles or Ts by setting a gage. A double-spindle hold-down is used for all work. Notching of 3x3x5/16 and 3x3x¼-in. angles can be done on the respective machines.

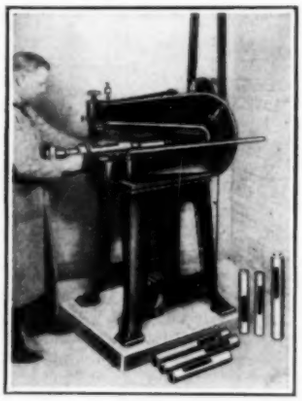
Power required when belted to the motor, is 4 and 6 hp. respectively. Weights 3,750 and 5,300 lb. net.

— 107 —

Nibbling Machine, Model 1-B, Special

Andrew C. Campbell, Inc., Bridgeport, Conn. [Vol.69,p.72]

Tubes used in the manufacture of oil burners may be slotted on this special machine. It has a special head with an out-board bracket in front and a block in the throat giving an



effective throat depth of 16 in. The operating time for cutting a hole in the sides of the tube was 40 sec. The out-board bracket has a quick-acting swing clamp to hold the support for the mandrel, thus enabling the tubes to be put on rapidly. No finishing is necessary.

— 108 —

Punch, Metal, No. 7½

Whitney Metal Tool Co., Rockford, Ill. [Vol.69,p.377]

This No. 7½ punch has a capacity midway between that of the No. 7 and No. 8 punches. It will punch a ¼-in. hole through ⅝-in. plate. The gap is 4 in. in depth and 3 in. in height. The overall length is 22 inches.

The drop-forged operating handles will not become dis-

engaged. All wearing parts are hardened. The device will punch inside of 90 deg. It is furnished with three punches and dies.

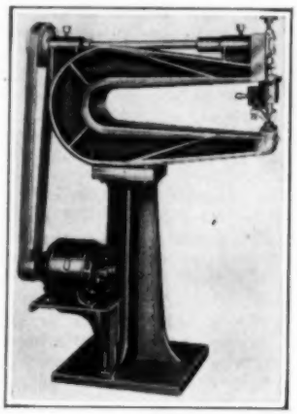
Weight 10½ pounds.

— 109 —

Cutter, Metal, 30-Inch, No. 00

W. N. Savage Co., Knoxville, Tenn., [Vol.69,p.598]

Sheet steel up to ¼ in. in thickness can be cut to any form or split on this cutter, which has a depth of throat of 30 in. and a cutting speed of 30 in. per min. The turret head turns in any direction and the



cutter mechanism consists of a reciprocating cutter used in connection with a lower die. Strokes for either shearing or nibbling are 900 per min.

Height 62 in., length 46 in., width 20 in.; weight 115 lb. net.

— 110 —

Shear, Vise, "National"

National Machine Tool Co., Racine, Wis. [Vol.69,p.906]

Designed to be mounted in a vise lengthwise or crosswise, this shear has a capacity for ½-in. flat stock and ⅜x2-in.

bars. The blades are made of tool steel, and can be removed easily for sharpening. The shear body is designed to permit easy slitting of wide sheets. A 7/16-in. rod cutter is furnished also.

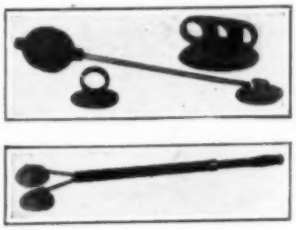
— 111 —

Lifting Devices, Vacuum, for Handling Stock

Lewis Jones, Rayen & Foster Sts., Youngstown, Ohio. [Vol.69,p.635]

Metal sheets may be lifted with the aid of these vacuum devices. Lacerations to the fingers are avoided. The device with the ring is used for lifting the edge of a metal sheet. A larger size, No. 4, measures 4 in. in diam.

A punch-press feeder for light materials employs a hand



bulb to exhaust the rubber disk. The other punch-press feeder, of the bicycle-pump type, is used for lifting larger sheets. The body is of steel tubing.

Threading Machines

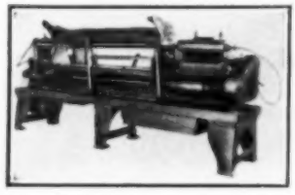
— 112 —

Threading and Chamfering Machine, Automatic, Double-End, No. 4 TM

Grant Manufacturing & Machine Co., Bridgeport, Conn. [Vol.69,p.217]

Work from 7 in. to 6 ft. in length and from ½ to 2½ in. in diam. can be handled. Besides chamfering and threading, the machine will also do hollow milling, working on both ends simultaneously. The heads are operated by large cast-iron cams adjustable on the camshaft at the front. Continuous-tooth herringbone gears drive the spindle.

The rods are fed from the



magazine by arms operated from the camshaft, so that only one piece at a time can drop into the jaws. The machined rod is ejected by two spring plungers on the jaws, and a safety clutch is provided. Production on chamfering 2½-in. tubes was 700 an hour.

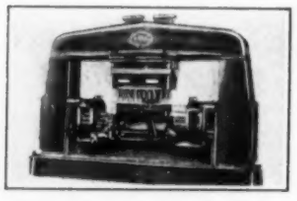
The plates for the driving cams are screwed to the cam drums, and can be changed readily. The cams give a positive backward motion to the magazine, and the forward movement is controlled by heavy springs. The magazine slides are pack-hardened, and the jaws are of tool steel.

— 113 —

Tapper, Leadscrew, Three-way, Special, Natco

National Automatic Tool Co., Richmond, Ind. [Vol.69, p.447]

All holes on three surfaces of cylinder blocks can be tapped in one operation. A total of 61 holes are tapped, 30 on the top, 22 in the front, and 9 in the rear end. Production is



quoted at 60 blocks per hour.

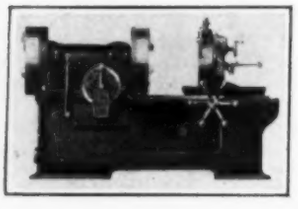
Each tap on this machine has an individual leadscrew. Both the vertical head and the two horizontal heads are driven by the main reversing box in the rear, which is, in turn, driven by a 30-hp. constant-speed motor. The operator starts the machine by pulling the handle of the air valve. The spindles are reversed automatically when the proper depth is reached, and stop themselves as soon as the taps are withdrawn. The taps can be withdrawn quickly in case of an emergency.

— 114 —

Threading Machine, Pipe, "Super Six"

Hall-Will, Inc., Erie, Pa. [Vol.69,p.295]

Pipe in sizes from 1¼ to 6 in. may be threaded and cut off. Rotative speeds vary from 59



to 12 r.p.m. In the left-hand recess of the base is mounted the 5-hp. motor for driving, while the right end contains a removable chip bucket. The left-hand chuck is of the three-jaw universal type operated by a chuck wrench, while that at the right is of the same type, but lever operated. Starting, reversing, or stopping are effected at the push-button station.

The patented diehead automatically gages the length of thread. The dies are ¼ in. wider than the longest thread, thus permitting the cutting of full-width threads under all conditions. The gage is permanently set for all diameters, but is adjustable for cutting a thread longer or shorter than standard.

The bits are double-ended, and are made of high-speed steel. The adjustment of the head is taken care of by a large segment in the operating cam. An extra long, cast-steel, cut-off block is included. A high-speed steel bit is used in the swivel-type reamer. An outside chamfering device is located next to the cut-off blade.

The gearbox is a separate unit, and has the shafts mounted on Timken bearings running in oil.

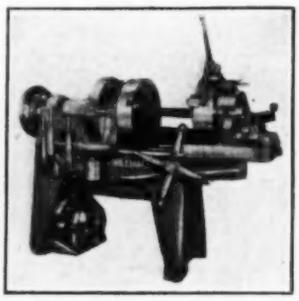
Cooling of the dies is accomplished by the use of a high-pressure, fan-type stream of coolant with adjustable control.

— 115 —

Threading Machine, Pipe, Series 104, "Wilco"

Williams Tool Corporation, Erie, Pa. [Vol.69,p.979]

Regular pipe sizes that may be threaded on the "Wilco" Series 104 machine range from 1 to 4 in., but extra sizes include ½ and ¾ in. Bolts from



½ to 2 in. in diam. may also be threaded. The minimum length of nipple that can be handled without a holder is 5 inches.

Four removable high-speed steel chasers are used for cutting threads, and each size of pipe requires its own set. The chasers can be removed rapidly. The dies are held in an adjustable mechanism, which is operated by moving the hand lever. Lubrication of the dies is effected by means of nozzles built into the diehead itself. The head traverses along the ways for 15 in. Lathe-type tools for cutting off, reaming, and chamfering are placed at the right-hand end.

The heavy three-jaw chuck is carried by a spindle running in large bearings, having automatic lubrication by means of a chain dipping into a bath of oil. Four changes of spindle speed are provided. These are 13.5, 18.2, 27.3, and 40 r.p.m. A reverse gear is included.

Drive is by means of a 3-hp. motor through a chain drive up to the four-speed gearbox. Both the clutch and the cut steel gears run in oil.

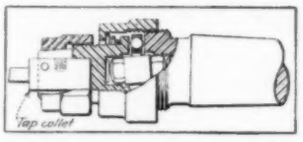
Floor space required, 5 ft. 2 in. by 2 ft. 0 in.; weight 2,000 lb. net.

— 116 —

Tap Holder, Full-Floating

Gairing Tool Co., Detroit, Mich. [Vol.69,p.175]

Positive drive to the tool, while permitting either eccentric or angular motion, is the feature of this tap holder. The tool-holding member is held against the ball thrust bearing by spring pressure caused by tightening a nut. This arrange-



ment permits angular motion. The tool-driving member has rounded hexagon ends and fits loosely into hexagon recesses in both the shank and the tool-holder, thus permitting floating movement.

— 117 —

Dieheads, Automatic, Nos. 8-H and 10-H, Hartness

Jones & Lamson Machine Co., Springfield, Vt. [Vol.69, p.181]

Two additional sizes of Hartness dieheads are available. The No. 8-H has a capacity from 1½ to 2½ in., while the capacity of the No. 10-H

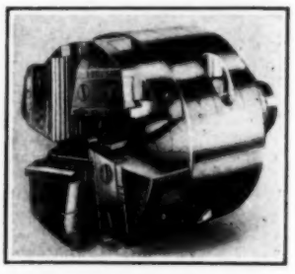
varies from 2 to 3 in. Both heads are equipped with chasers made from high-speed steel, ground and lapped in the thread after hardening.

— 118 —

Diehead, Pull-Off Type, Rotary "Landex"

Landis Machine Co., Inc., Waynesboro, Pa. [Vol.69,p.704]

This diehead is opened by retarding the forward movement of the diehead, and is closed automatically by an attachment



on the automatic screw machine. It is made of carbon steel, heat-treated throughout, and ground. Any misalignment in the machine or in the work is compensated for by the head, which is flexible on the shank. The chasers are supported on the face of the head. The device employs a worm for adjusting to size, and has a micrometer dial for further adjustments to close or free fits.

The diehead is locked within itself by engagement of two hardened closing pins. The spring for opening is located in the adjusting ring. Three sizes, namely, ½, ⅞, and 1½ in. are available. They are graduated for bolt and pipe threads within their ranges.

— 119 —

Stud Setters, Collapsible and Reversing

Weil Machine Co., 2648 East Fort St., Detroit, Mich. [Vol.69,p.714]

The collapsible type will not strip the threads when releasing even though the machine is in operation. Its jaws are made of tool steel and are chromed.

Additional nose pieces can be furnished to drive studs to any length of projection. The reversible type is shown. Both types are available in two sizes, the smaller taking studs from 0 to $\frac{7}{16}$ in. in diam., while the larger will drive studs from ½ to ⅝ in. in diameter.

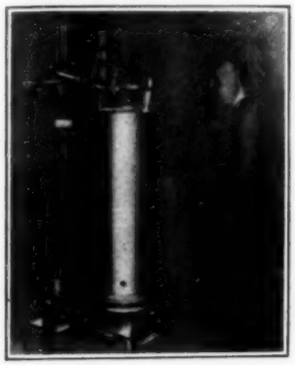
Welding Machines

— 120 —

Welder, Tank, "Electronic Tornado"

Lincoln Electric Co., Cleveland, Ohio. [Vol.69,p.376]

Welding speeds of 100 to 150 ft. per hour may be obtained on this machine, which is constructed entirely from welded



steel. In making an edge weld, no additional filler metal is used. The welder is suitable for work such as range boilers, and oil and gas tanks.

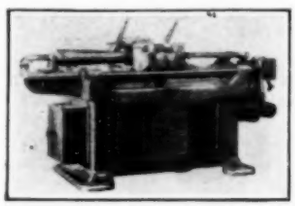
The holding fixture consists of a rotating table, driven by a small variable-speed motor, and a vertical support, carrying a fixed steadyrest, and the welding head. The "Electronic Tornado" welding head is flexibly mounted.

— 121 —

Welder, Butt, for Mufflers, Special

Taylor-Winfield Corporation, Warren, Ohio. [Vol.69,p.860]

On the job shown, the heads of the muffler are welded to the body, and the intake and the outlet tubes are welded to the heads. The machine is known as the type B-11 special spot



welder, and may be used in fabricating the various gages of stock used for mufflers. The timing of the current and the upsetting of the weld are accomplished by the use of adjustable cams. According to the manufacturer, the appearance of the weld is uniform, and it is of high accuracy.

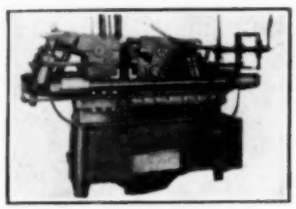
— 122 —

Welder, Butt, No. 19 S.P.

Thomson Electric Welding Co., Lynn, Mass. [Vol.69,p.1012]

This butt welder was designed for handling rings rolled up out of bar stock 6½ in. in width by ¾ in. in thickness, by 12 in. inside diam., up to rings 15 in. wide by 2½ in. thick, by 27 in. inside diam. The maximum cross-section at the point of the weld for any size must not exceed 12 sq. inches.

The clamping irons and beams for holding the material while being welded are made of solid steel plate. There are four of these, each pair being opened and closed by a hand lever, which is located at the front of the machine. Pressure for clamping them is obtained through four hydraulic cyl-



inders, each pair being controlled by a separate valve. The total clamping pressure from each cylinder is 56,000 lb., making a total of 112,000 lb. on each side of the ring. The cylinders are designed for operation under 1,500 lb. per square inch.

The stroke of each piston is 4 in. and the minimum platen opening is ¾ in., giving a total maximum platen opening of 4¾ in. between the welding dies. The pressure cylinder is returned to the open position by means of small hydraulic cylinders opposed to it.

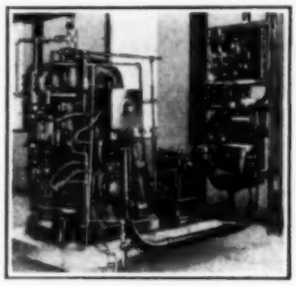
Distance from floor to top of welding dies is 50 in. Overall dimensions: width, 6 ft.; length, 9 ft.; height, 5¼ ft.; base, 26½x67 inches.

— 123 —

Welder, Spot, for Structural Work, Heavy-Duty, No. 40-AV

Thomson Electric Welding Co., Lynn., Mass. [Vol.69,p.255]

Structural shapes or plates not over ½ in. in thickness can be spot welded. Multiple-projection welds can be made on stamped metal parts if desired. Current control for different thicknesses is obtained through



a 5-point regulator switch. The transformer is of the air-cooled, split-core type, and is rated at 250 kva. Operation is controlled through a push-button switch.

The horns are made of cast copper, and are water cooled. Vertical adjustment of the lower slide is 4 in., and the maximum distance between the slides is 10½ in. The distance from the outermost edge of the slides to the frame is 12 in. Distance from the frame to the center of pressure is 8½ in. The flat faces of the slides are 7 in. square.

Either an accumulator system or an Oilgear pump can be used to actuate the hydraulic piston, which has a stroke of 3 in. The Oilgear pump requires a 7½-hp. motor. A four-way, manually-controlled, hydraulic valve controls the system.

Dimensions, not including Oilgear pump or motor, 4x4½x7 ft.; weight, 7,000 pounds.

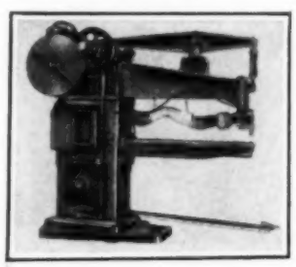
— 124 —

Welders, Power-Driven, Deep-Throat, No. 75-PA-48

Thomson Electric Welding Co., Lynn, Mass. [Vol.69,p.669]

Light tanks, smokestacks, and cylindrical parts made from sheet material up to ¼ or 5/16 in. in thickness can be welded on this deep-throat machine, which is similar to the Model 75-PA, built by the same company. It has a 48-in. reach, and the lower horn will take a minimum diameter cylinder of 8½ in. The welder is suitable for joining a maximum thickness of two pieces of ⅛-in. material.

The welder has a transformer of 150-kva. capacity, and is arranged for direct motor drive through spur gears, giving four welding speeds of approximately



21, 27, 37 and 51 cycles per min. The maximum pressure at the die point is 2,000 lb., and this pressure is adjustable. The upper die lift is approximately ¾ in. The lower horn has no vertical adjustment.

Weight, 5,900 lb. net.

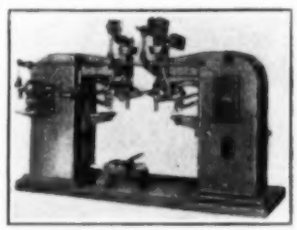
— 125 —

Welder, Door-Frame, Special

Thomson Electric Welding Co., Lynn, Mass. [Vol.69,p.865]

Vertical side members are welded to the top and bottom cross-members of steel door frames by this special machine. The door frames vary from approximately 2 to 4 ft. in overall width, and are made of 22-gage material. The end members are tongued to fit into the side members, and are spot welded.

The unit consists of two standard heavy-duty spot welders set up opposing each other and connected so that both heads are operated from one drive. The equipment was designed to operate at the rate of 100 spot welds per min. The two welders are intended to be mounted on a sub-base having an adjustment for the different widths of doors. A special carriage and work table, mounted on wheels and running on a track, must be supplied by the user. The shifting of the upper die points for making a row of three spot



welds is done automatically. A special mandrel is attached to the carriage, and is supplied by the customer. The spots produced are spaced ½ in. apart, and the end of a door frame is welded to both of the side members at once.

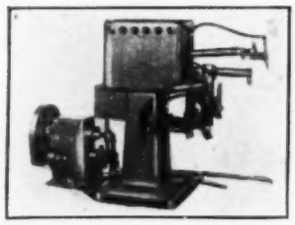
— 126 —

Welder, Spot, No. 176-C, Special

Thomson Electric Welding Co., Lynn, Mass. [Vol.69,p.941]

Multiple tooling is the feature of this special model 176-C spot welder, which is designed especially for welding a box. It requires several different electrode combinations in order to reach all the corners. For this purpose, a multiple-electrode holder is provided.

The machine is rated at 15



kw. and may be either foot- or power-operated. Drive is through a six-speed gearbox furnished for either belt or motor drive. The lower terminal post swivels to three positions, and the horns and dies are fully adjustable both horizontally and vertically. The upper die also swivels horizontally and may be adjusted vertically.

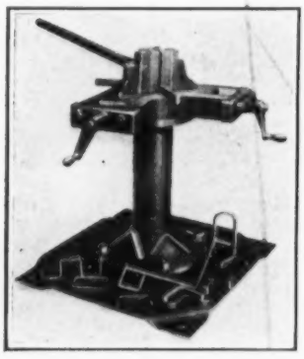
Other Machines

— 127 —

Bending Machine, "Ever Ready"

John E. Naidain, Sparrows Point, Md. [Vol.69,p.599]

Flat, round or square bars can be bent to various angles on this machine. There are no changes in parts to be made for the different jobs, and no adjustment need be made for different thicknesses of material. The dies open and close the same on both angles.



This machine has a two-way bending head and two working jaws. Each jaw works independently of the other, and it opens and closes the gripping die with equal distance at right angles. The bending head and jaws are 6 in. high and will take stock up to 6x1 in. The machine is portable.

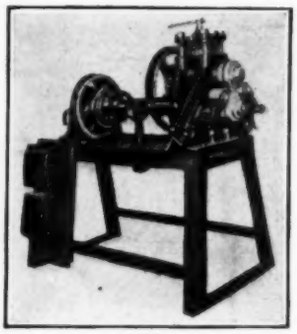
Floor space, 30 sq. inches.

— 128 —

Bending Rolls, Vertical-Type, No. O

Buffalo Forge Co., Buffalo, N. Y. [Vol.69,p.751]

By means of three hand-operated cranks, the rolls of this machine can be adjusted in a few seconds. The frame is a one-piece steel casting, and the legs and table are of welded steel. A quick-acting clutch is provided. The machine is driven by a 2-hp. motor having push-button control. Belt drives can be obtained. Bronze bushings are used throughout, and the Zerk lubricating system is standard. The speed of the rolls is 20 r.p.m. Angles 1½x3⅛ in. can be bent with the leg out to a minimum diameter of 7 in., standard pipe ¾ in. to a minimum diameter of 6 inches.



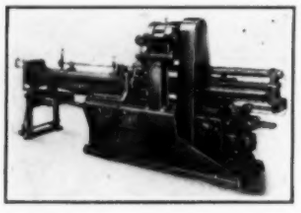
Length, 3 ft. 10 in.; width, 2 ft. 6 in.; height, 2 ft. 6 in.; weight, 750 lb. net.

— 129 —

Broaching Machine, High-Speed, Improved, No. 3

Oilgear Co., Milwaukee, Wis. [Vol.69,p.72]

Rearrangement of the piping below the cylinder has improved the appearance and made the machine more compact. Safety and relief valves have been manifolded onto the pump. A control valve is provided to safeguard the operator.



The No. 3 machine is shown in the illustration. It was described on p. 172, Vol. 63, of the *American Machinist.*

The crosshead is equipped with an adjustment for raising and lowering the drawhead slide to accommodate different pull center lines. This feature is useful when broaching keyways, where it is necessary to raise the center line of the draw bar in order to obtain the proper depth of keyway.

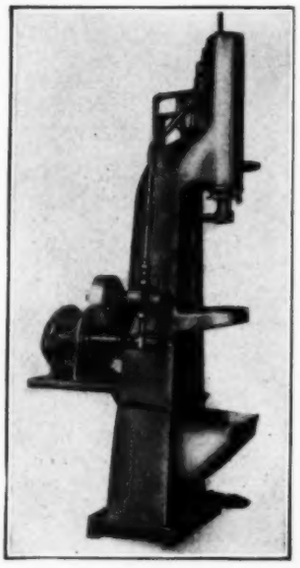
— 130 —

Broaching Press, Vertical, 2-Ton, Type V-1

American Broach & Machine Co., Ann Arbor, Mich. [Vol. 69,p.823]

Broaching, push pressing, and arbor pressing are among the operations which can be performed. The machine may be either belt or motor-driven, and is operated by oil pressure. It is controlled by a hand lever and pedal, and is so arranged that, immediately upon release of either lever, the ram returns automatically to the top position.

The stroke is 14½ in., and the end of the ram is tapped ¾ in., 16 threads per inch. The work table is bored 2¾ in., central with the ram. Work up to 10½ in. in diam. can be handled and the table surface is 8 in. in diam. The return of the ram is made at 25 per cent increase in speed over the downward stroke. When running at 600 r.p.m., the working speed of the ram is 14 ft. per min., but the drive pulley can be operated at speeds as high as 1,200 r.p.m., with proportional increase in the ram speed.



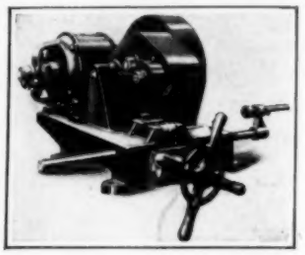
— 131 —

Cutting-Off, Machine, Pipe

Oster Manufacturing Co., Cleveland, Ohio. [Vol.69,p.482]

Pipe in nominal sizes from ⅛ to 2 in. can be cut off on this machine. Under actual working conditions, production records of 355 ⅛-in. pieces per hour, and 210 2-in. pieces per hour were obtained. The machine is available in both belt- and motor-driven types.

The cutter disk is mounted in a movable arm, and is brought down on the pipe, which rests on rollers. The action of the arm holding the cutter disk is controlled by a screw feed and handwheel. A length gage is provided. The machine is driven by a 1-hp. motor.



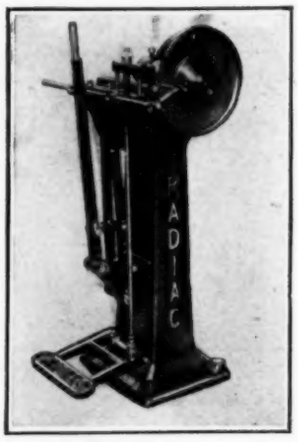
Dimensions: Height, 17 in.; length, 26 in.; width, 18 in.; for the belt-driven machine. Weight of the belt-driven machine, 170 lb.; motor-driven machine, 250 lb.

— 132 —

Cut-Off Machine, No. 1, "Radiac"

A. P. DeSanno & Son, 1615 McKean St., Philadelphia, Pa. [Vol.69,p.939]

This machine is designed for the cutting of tubing, bar, round, or flat cold-rolled steel, hardened steel, and various alloys. The spindle operates at 5,000 r.p.m., and the 12-in. abrasive wheen travels at a speed of 15,700 surface ft. per min. The spindle is mounted in self-aligning ball bearings, and is operated on a sliding head so that the wheel is drawn to the material to be cut.



Work is held in a V-shaped slot by means of a quick-acting foot clamp. The special "Radiac" cut-off wheel is 12 in. in diam. by ⅛ in. thick. A motor of 7½ hp. is required.

The right hand is used to operate the wheel by means of the lever shown, the left hand is used for feeding the work, and the foot pedal clamps and releases the material.

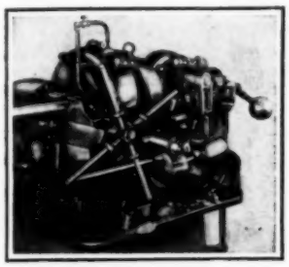
Height, 46 in.; floor space required, 15x24 in.; weight, 320 lb. net.

— 133 —

Cutting-Off Machine, Rotary, with Power Feed, Taylor

George Scherr Co., Inc., 142 Liberty St., New York, N. Y. [Vol.69,p.1015]

A rotary cutting-off machine for bar stock and tubing, is being introduced into this country by the above company, agent for C. Taylor, Ltd., Birmingham, Eng., the maker. The machine is built in two sizes. The No. 1 machine will take 3-in. bars and 4-in. tubing. The No. 2 will take 4½-in. bars and



6-in. tubing. The smallest diameter material that either will cut is ½ inch.

Inasmuch as the bar does not revolve, it is possible to hold material of any cross-section within the capacity of the vise jaws. The cutting-off time for a 1-in. bar is given as 12 seconds.

The bar is placed on V-roller guides, and is pushed into the spindle against the pedal-operated stop at the rear. The construction is such that feeding in the stock, gaging it, and clamping the vise jaws, are practically one operation. Ball bearings are fitted to receive all thrusts. The cutters feed in against helical springs, which return them automatically to their original position.

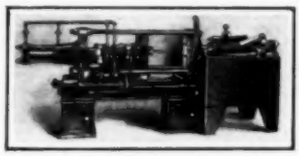
The rectangular cutters are offset parallel with the axis of the work. Neither cuts the full width of the parting, thus leaving side clearance for chips. The cut is divided not only in width, but also in depth, through the medium of a unique equalizing mechanism.

— 134 —

Die-Casting Machine, Lester

Reed-Prentice Corporation, Worcester, Mass. [Vol.69,p.673]

An improved type of the Lester die-casting machine in four sizes has been developed by the P. & R. Tool Co., Inc., Worcester, Mass., and is being built by the above company. The chief difference from the previous models is in the mechanism providing for the automatic filling for the goose-



neck, which transfers the metal from the furnace and delivers it to the dies under air pressure. The machine is capable of 250 to 300 pieces per hour. Castings can be made varying from a fraction of an ounce to 5 lb. in aluminum.

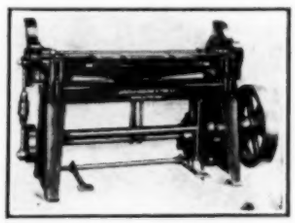
The machine is semi-automatic in operation, and a 10-hp. motor will operate three machines at maximum production. The die-casting toggle mechanism is operated hydraulically by oil. Two levers are used to control the machine from the front. The maximum die openings range from 17 to 34 in., while the platen openings range from 9⅜ to 20 in. The weights vary from 6,000 to 15,000 pounds.

— 135 —

Power Folder, 42-Inch

Jarecki Machine & Tool Co., Grand Rapids, Mich. [Vol.69, p.36]

Folding 16-gage sheet metal 42-in. in length can be performed. A center bearing is provided to take care of springing. The machine is driven at both ends of the shaft to give an even distribution of pressure, and so that twisting of the sheet cannot take place. It can be



built longer if desired, and as many hinged bearings as are required can be placed along the bed. Sufficient reserve power is provided by a 250-lb. flywheel. The ratio of the gearing is 3 to 1. The machine can be built either for belt or motor drive.

Overall height, 42 in.; floor space, 30x72 in.; weight, 2,400 pounds.

— 136 —

Forming Machines, Sheet-Metal, Slip Roll

Niagara Machine & Tool Works, Buffalo, N. Y. [Vol. 69,p.517]

A trigger release permits the top roll of this machine to be swung forward upon completion of the forming operation, thus saving the operator's time. A special gear arrangement permits setting the front rolls apart sufficiently to allow folded edges of sheets to pass through. Three sizes are available having roll lengths of 30, 36 and 42 in. All sizes have capacity up to 22 gage.

The base is a heavy box sec-

tion. A full bearing sleeve is provided on the movable end of the front roll.

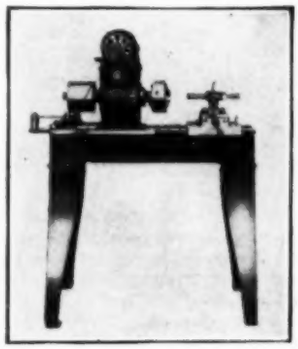
Weights, 195, 230, and 265 lb., respectively.

— 137 —

Groover, Oil

Watson Brothers Machine Co., Bound Brook, N. J. [Vol. 69,p.862]

Bushings up to 6 in. in diam. and 6 in. in length can be grooved on this machine, which will also cut cams or score bush-



ings and inserts with endless cross threads for die castings. A taper attachment can also be supplied.

The hollow spindle is threaded on the end so that an air chuck can be attached. The groover is driven through a wormwheel direct-connected to a ¼-hp. motor. Three changegears give spindle speeds of 60, 80 and 120 r.p.m. The toolpost may be turned through a considerable angle, and it rests upon a cross-slide. A small bench model and a larger size can be supplied.

Length, 58 in.; height to center of spindle, 41½ in.; floor space required, 20x60 in.; weight, 500 lb. net.

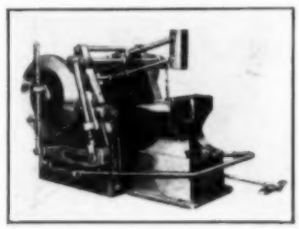
— 138 —

Hammer, Blacksmith, Model B

Blacker Engineering Co., Grand Central Terminal, New York, N. Y. [Vol.69,p.73]

Designed for general utility and jobbing blacksmithing work, this hammer retains all the features of earlier designs, but is larger and heavier. Thrust bearings have been fitted in the control mechanism, and the motor drive has been rearranged.

The hammer will strike 140 blows per min. It works upon an ordinary 500-lb. anvil, and the usual hand-forging tools are employed. A link motion permits positive control of the blows, and the head may be traversed along the anvil face. Automatic knock-offs permit handling a wide variety of jobs.



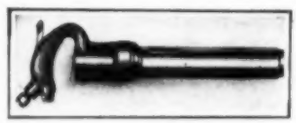
Double-shouldering operations are performed on the central "cut-out," placed in front of the anvil. Play of the hammers is taken up by the flywheel springs.

— 139 —

Hammers, Riveting

Ingersoll-Rand Co., 11 Broadway, New York, N. Y. [Vol. 69,p.412]

Four sizes of these riveting hammers having strokes of 5, 6, 8 and 9 in. have been developed. On this type, the handle, which is threaded to the barrel, is kept tightly in place by a spring-locking device. The valve operates in a hardened



and ground valve chamber located at the head of the barrel, and is clamped in place by the handle. The valve box has a solid upper end, which provides a positive compression chamber for the piston on its up stroke. This feature prevents any knocking against the handle.

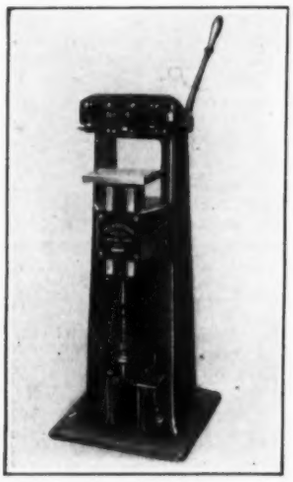
The barrel is made of special steel, heat-treated and ground. An open-type outside trigger handle is furnished as standard, but closed- or inverted-type handles can be supplied.

— 140 —

Marking Machine, No. 4

Noble & Westbrook Manufacturing Co., 20 Westbrook St., East Hartford, Conn. [Vol. 69,p.335]

Trademarks, names, letters, and numbers up to 4½ in. in length can be marked on flat or round metal parts. Slides can be provided, however, to carry dies for marking up to 6 in. in length. As in the previous No.



3 model, which this machine replaces, the parts are held in a fixture. This machine has no projecting parts to hamper the operator.

A treadle raises the table toward the die by means of a compound lever system. A handwheel, placed on the elevating screw graduated in thousandths, is used to regulate the height of the table stroke. The heavy slide is fitted with roller bearings. Stops control the length of the stroke. Movement of the slide is secured through heat-treated steel gears actuated by a long lever.

Movement of the die holder in or out is secured by the use of an adjusting screw. The die is returned to the starting position by a spring. The machine can be fitted with a flat die.

Floor space, 20x20 in.; weight, 425 pounds.

— 141 —

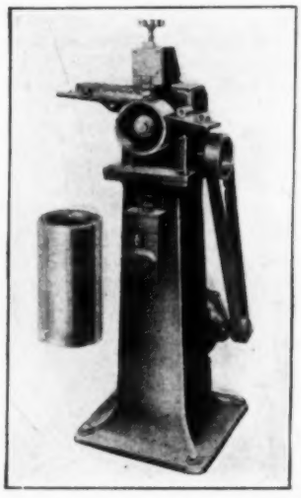
Marking Machine, Rapid Production, No. 19

Noble & Westbrook Manufacturing Co., 20 Westbrook St., East Hartford, Conn. [Vol.69,p.899]

Sizes and trademarks can be marked on round parts up to 1¼ in. in diam. by various lengths on the No. 19 rapid-production marking machine, providing that they have sufficient body to prevent crushing. The machine is self-contained, and is driven by means of a ½-hp. motor. A loading platform and an apron to take the work from the machine are featured. These are adjustable.

The parts are placed in the proper position on the inclined chute, and the action of the machine carries them to the marking die. After being marked, they are thrown off automatically into a receptacle. The steel stamp is attached to the face of the small vertical slide. The stamp is adjusted through the handwheel.

Other ranges of sizes can be handled by the same machine by substituting different sized feed rolls, and longer pieces by adjusting the outer retaining



disk. Production is quoted at 100 pieces or more per minute.

Weight 450 lb.; floor space, 18x24 inches.

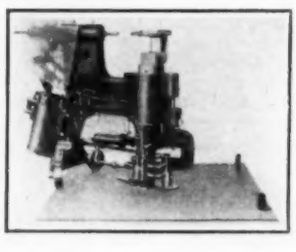
— 142 —

Riveter for Chassis Side Bars, Web

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.69,p.174]

Web rivets in either side of a suspended chassis frame may be driven by means of this revolving riveting machine. The stake, which supports the stationary die, and which enters the interior of the chassis frame, can be rotated about its vertical axis or locked in two positions, 180 deg. apart. The upper portion of the stake adjacent to the die mountings is "goosenecked," and has double die mountings on the one axis so that a mounting is always in position to oppose the movable die.

By indexing the stake, the offset is thrown to the right or



the left and permits centering the die regardless of whether the flange legs extend to the front or the rear.

The riveter will exert 30 tons on the dies when 100-lb. air pressure is used. It will drive ¾-in. hot rivets and $\frac{7}{16}$-in. cold rivets. It is also available in a 20-ton size.

— 143 —

Riveter for Tubular Rivets, Pneumatic, Portable

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.69,p.376]

A pressure of 1 ton on the dies may be exerted by this small portable pneumatic riveter. The machine, which weighs 15 lb., has a 5-in. depth of throat, a 2-in. gap, and a

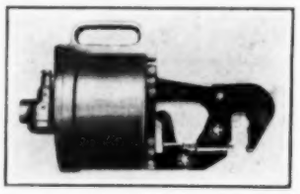
1-in. die stroke. It is capable of driving tubular bronze or steel rivets up to $\frac{5}{16}$ inch.

— 144 —

Riveters, Squeeze, 3½- and 6-Inch, "CP"

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. [Vol.69,p.598]

These squeeze riveters are built in two sizes. The 3½-in. size has a capacity of 5 tons, and will drive $\frac{1}{4}$-in. steel rivets, $\frac{5}{32}$-in. duralumin rivets, and $\frac{3}{16}$-in. aluminum rivets. Its weight is 8 lb. The 6-in. riveter has a capacity of 10 tons, and



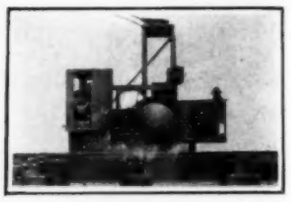
will drive $\frac{5}{16}$-in. steel rivets, $\frac{7}{16}$-in. duralumin rivets, and $\frac{3}{8}$-in. aluminum rivets. Its weight is 16½ pounds. The tool was particularly designed for airplane fuselage construction.

— 145 —

Sawing Machine, Metal, Friction-Type, Special

Joseph T. Ryerson & Son, Inc., Chicago, Ill. [Vol.69,p.704]

By stripping a portion of the base from discarded rail, a large traction company is making guard rail by the adapta-



tion of this special friction saw. A cut 33 ft. long through the base of a 100-lb. rail is made by the large 56-in. special steel blade, which revolves at a peripheral speed of nearly 5 miles per min. The ¼-in. blade cuts from 4½ to 6½ ft. per minute.

The machine has a welded frame and runway upon which the carriage travels. The carriage, also welded, carries the 100-hp. saw motor and blade, as well as the 3-hp. motor and reduction unit for propelling the carriage on the runway.

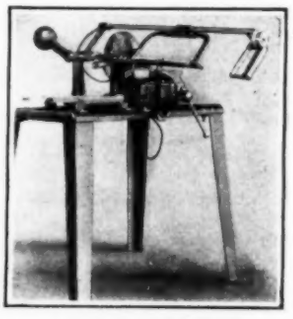
The operating power, which is d.c., varying from 550 to 650 volts, is taken from two overhead trolley wires.

— 146 —

Hacksaw, Power, Curve- and Angle-Cutting, "Mansaver"

J-B Engineering Sales Co., New Haven, Conn. [Vol.69, p.710]

Curve and angle cutting can be done on this power hacksaw, which is light and portable. It



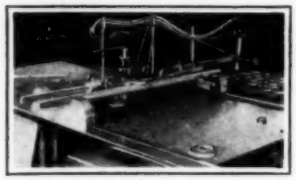
operates from a lamp socket. Both the motor and saw are mounted on a cast-iron base, and are so arranged that the entire saw and motor can be moved horizontally 12 in. while the saw is in motion. The saw operates through a 6-in. stroke at 150 strokes per min. The depth of the saw is 5¼ inches.

— 147 —

Shape-Cutting Machine, Oxy-Acetylene, "Oxweld"

Linde Air Products Co., 30 East 42nd St., New York, N. Y. [Vol.69,p.562]

This automatic oxy-acetylene, shape-cutting machine is designed to cut shapes of any sort from steel plate, billets, or in-



gots. The cutting blowpipe is mounted on a carriage, which is moved in any direction by means of an electric motor. For routine production it will operate automatically from a templet. In cases where only a few parts are to be cut, a hand tracing device is used.

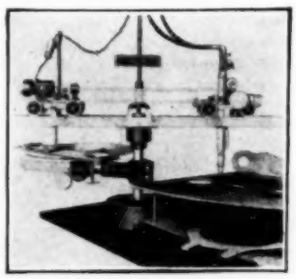
Little machining is necessary after cutting. The speed of cutting ranges from 3 to 20 in. per min., depending upon the thickness of the metal. Cuts can be made in stock up to 1 ft. or more in thickness.

— 148 —

Shape-Cutting Machine, Automatic

General Welding and Equipment Co., 66 Brookline Ave., Boston, Mass. [Vol.69,p.711]

Irregular outlines may be cut with a torch or other tool directly from drawings or patterns by means of this machine. A substantial base and short column support a centrally located and balanced track system. By means of a roller and



ball bearing system, the tracks can be turned easily about the center of the column. Two carriages of equal weight are mounted on the column, one carrying the tracing and driving element, and the other the tool. The carriage centers are set equidistant from the main center and two racks engaging a gearwheel act to keep the carriages always equidistant from the center when moving in and out.

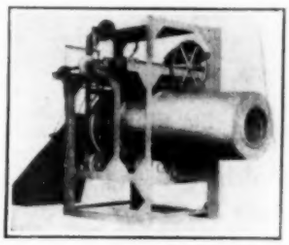
— 149 —

Tumbling Barrel, Star-Return

Ideal Industrial Machinery Co., Div. of the Consolidated Concrete Machinery Corporation, Winton Place, Cincinnati, Ohio. [Vol.69,p.182]

This barrel for tumbling drop forgings, heavy stampings and castings employs stars or slugs together with flint shot, silica sand or steel shot, using a weight of stars approximately equal to the weight of parts to be handled. The scale is removed from alloy steel forgings without denting the work and without destroying the corners.

The parts are charged into the machine by means of a power loader. A patented cup arrangement of simple and rigid design separates the stars and sand from the work when the



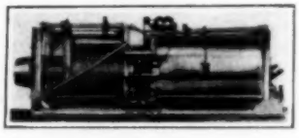
barrel is discharged and returns them to the tumbling department when tumbling is again started. The barrel is equipped with an exhaust hood. The machine is built in sizes having from 24x18 to 48x60-in. tumbling compartments.

— 150 —

Tumbling Machine for Galvanized Forgings

Ideal Industrial Machinery, Div. of the Consolidated Concrete Machinery Corporation, Winton Place, Cincinnati, Ohio. [Vol.69,p.634]

Forgings are tumbled after hot galvanizing in this machine to shake off excess zinc. The perforated charging end is hooded, and rotates at about 50



r.p.m. The products are dumped directly into the screen and are tumbled as they pass through. From this screen they pass into the secondary drum, which dips into a pan of water. At this point the forgings are quenched and then discharged. The machine is portable.

— 151 —

Chucking and Turning Machines, Automatic

Potter & Johnston Machine Co., Pawtucket, R. I. [Vol.69, p.377]

Geater capacity than in the model 6-D, is found in the models 6-DE and 6-DL. The 6-DE has a swing of 29½ in., which is 5 in. more than on the 6-D. The 6-DL has a turret slide travel of 28 in. as against 18 in. for the 6-D. This extra travel is of value where it is necessary to pilot long boring cuts.

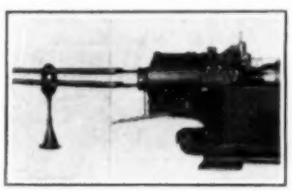
— 152 —

Roll Feed for Automatic Bar Turning Machine

Cleveland Automatic Machine Co., Cleveland, Ohio. [Vol.69, p.178]

Rapid production of pipe coupling blanks or other simple parts from hot-rolled stock 35 ft. in length is facilitated by this roll-feed mechanism. It is applied to the especially adapted Model M, automatic 2- and 1½-in., four-spindle, bar machines, designed for four-position work. The mechanism includes a support for the rods, consisting of four housings held by adjustable standards.

The feed rolls are V-shaped



and mounted on toggle arms. They are driven continuously by gears actuated by a chain geared to the lower camshaft in the rear. Cams on the same shaft control the action of air cylinders governing the roll mechanism. Compression springs back of the finger blocks compensate for any irregularity in the stock, so that the feed of one bar is not affected by the feed of any other bar. The bars are gaged by four stops mounted on the center driveshaft sleeve. The feed rolls release the stock upon chucking by a reversal of the air pressure which releases the toggle arms.

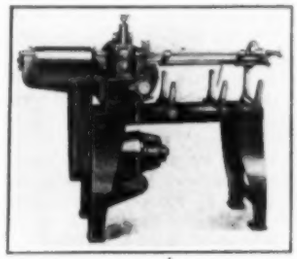
— 153 —

Straightening and Cutting Machine, Wire, Rotary, Automatic, No. 7-C

Lewis Machine Co., Cleveland, Ohio. [Vol.69,p.71]

Two sizes of this machine handle wire from $\frac{1}{16}$ to $\frac{3}{16}$ in. and from $\frac{1}{16}$ to $\frac{1}{4}$ in., respectively. The straightener arbor, main drive shaft, and flywheel are mounted on Timken tapered roller bearings.

The arbor consists of five sets of dies, which may be either hard iron or bronze, depending on the finish desired. The



clutch is of the punch-press type. Operating parts consist of a trip lever and a clutch dog which drives the flywheel shaft. This shaft revolves only when the wire is being cut off. A cam on the flywheel shaft operates the cutter bar, and the feed rolls are geared directly to the flywheel. An automatic lever releases pressure from the feed rolls when the wire is being cut off.

The machine is driven through a double Texrope drive, and the 1½-hp. motor is mounted on a bracket bolted to the machine leg.

Height, 44 in.; floor space, not including the reel, 16½x36 in., for the 2-ft. machine, and 16½x48 in. for the 3-ft. machine. Weight of the larger machine, 775 pounds.

— 154 —

Wire Stripper, Centrifugal, Mahan

Webber Machine Corporation, 33 S. Water St., Rochester, N. Y. [Vol.69,p.298]

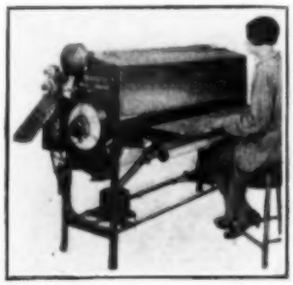
The centrifugal wire stripper developed by C. B. Mahan, 162 Longview Terrace, Rochester, N. Y., has been sold by him to the above company. The machine was described on page 791, Vol. 68, of the *American Machinist*.

— 155 —

Blueprinting Machine, Continuous, Horizontal

Shaw Blue Print Machine Co., Inc., 9 Campbell St., Newark, N. J. [Vol.69,p.940]

Production of 850 sq.ft. of blueprints per hour can be obtained. The machine consists essentially of a half-cylinder of plate glass mounted in cradles



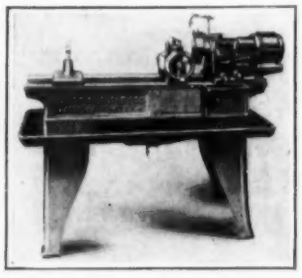
on end castings, around which passes an endless canvas band. A flaming arc lamp operates back and forth across the machine. Sixteen speed changes from 4 in. to 4 ft. per min. are obtainable. Prints up to 42 in. in width by any desired length can be made. The tracings are returned to the operator at the top, while the prints go to the receiving table at the rear.

— 156 —

Centering Machine, Hand, Single-End, Model B

Pratt & Whitney Co., Div. of Niles-Bement-Pond Co., Hartford, Conn. [Vol.69,p.412]

Work up to 4 in. in diam. can be held in the V-jaws of the self-centering vise used on this machine. The vise is operated by a handwheel, and can be adjusted to any position along the bed. The compact drillhead mounts a ½-hp. motor



running at 1,750 r.p.m., driving the spindle through reduction gearing at a speed of 1,000 r.p.m. Timken bearings support the spindle, which has a sliding sleeve that permits the drill to be advanced 1½ inch.

At every advance of the spindle, a stream of cutting fluid is supplied to the drill automatically. A spring safety device controls the pressure that can be exerted on the drill point.

An adjustable stop is provided at the spindle nose for gaging the depth of holes. To hold the outer end of the work, a V-support is provided. It is adjustable vertically, and can be moved along the bed.

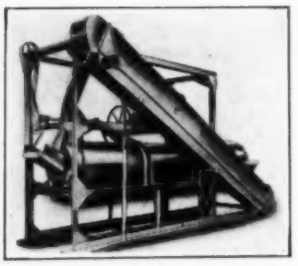
Floor space, 60½x29½x45 in. Weight, 750 lb. net.

— 157 —

Drying Machine, for Metal Parts, Sawdust

Ideal Industrial Machinery, Div. of the Consolidated Concrete Machinery Corporation, Winton Place, Cincinnati, Ohio. [Vol.69,p.669]

In this machine the work and sawdust pass through the drums together. In the last section of the drum, which is perforated, the sawdust is screened out and



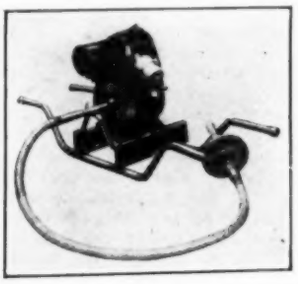
drops onto the heated drag conveyor to be carried back to the intake end. There is always a constant stream of hot dry sawdust passing through the machine. Heat is also applied to the solid portion of the drum to dry the work thoroughly.

— 158 —

Flexible-Shaft Unit, Gasoline-Driven

Stow Manufacturing Co., Inc., Binghamton, N. Y. [Vol.69,p.74]

Grinding, drilling, filing and sanding may be done on isolated jobs by means of this gasoline-driven, flexible-shaft unit. It has a capacity of 2.2 hp., and has the speed adjustable from 1,400 to 2,200 r.p.m. The unit is supported on channel-iron cross members carried on bars conveniently bent so that two men can carry the equipment. A



No. 5 flexible shaft 10 ft. in length and having a metal case is provided. The shaft will carry an 8x1-in. wheel.

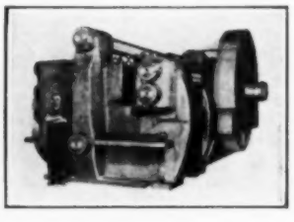
Weight, 176 pounds.

—159 —

Forging Machine, 365,000-Pound

National Machinery Co., Tiffin, Ohio. [Vol.69,p.480]

Hot forgings requiring little machining can be produced by the internal-displacement method on this machine. Pieces up to



14 in. long and having an external diameter of 8¾ in. and an internal diameter of 6¼ in. have been produced. As an example of the accuracy to which successive pieces can be held, ball and roller bearing races 3 in. in diam., varied only 0.01 in. in diameter.

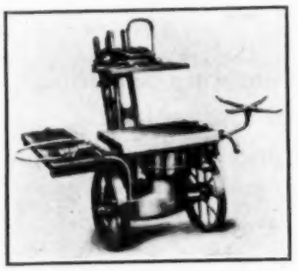
No flash is produced on hot forgings made by this machine. This is due to the massive construction of the bed, and also to the design of the heading and gripping slides. The long outboard support secures close registration of the die impressions. Usually the piece is made in three operations, through successive forming dies.

— 160 —

Molding Machine, "Jolt Squeeze", No. 276-J

Osborn Manufacturing Co., 5401 Hamilton Ave., Cleveland, Ohio. [Vol.69,p.258]

This machine is used for making a squeezer mold from match plates. It is of the open-end type. The table is 26 in.



long and 17 in. wide, and there are no side rods to limit the length of the flask used. Powerful and fast squeezing is provided by the dustproof squeezer piston which is 13 in. in diam. Three large, wide-face wheels make the machine easily portable.

— 161 —

Sander, Disk, 9-Inch

U. S. Electrical Tool Co., Cincinnati, Ohio. [Vol.69,p.369]

The unit is driven by a fan-cooled, universal motor running at 3,600 r.p.m. Ball bearings

are used throughout. A two-pole trigger switch is located in the handle. Fine, medium, and coarse sanding disks are furnished, together with 12 ft. of flexible, rubber-covered cable, a two-piece attachment plug, and an armored guard.

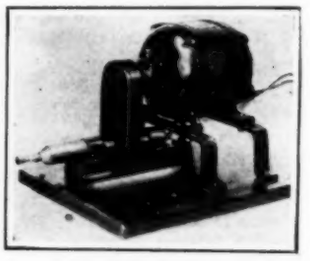
Weight, 12 pounds.

— 162 —

Tool, Screw and Nut Driving, Electric, Portable

Vim Tool Co., 149 Broadway, New York, N. Y. [Vol. 69,p.905]

Among the applications of this tool are: Driving wood and metal screws and nuts, drilling, grinding, tapping, and buffing. It is provided with a clutch, which automatically engages when the bit or socket is applied to the work. Power is de-



livered through a flexible shaft 6 ft. long. The tool can be supplied with a contrivance for reverse action, and is available in several bench and suspended models.

— 163 —

Separator, Screw Machine Products and Chip

McKenzie Engineering Co., New Rochelle, N. Y. [Vol.69, p.784]

An automatic feeding device and a lower unit construction than heretofore are featured in this improved machine, which is

intended for the separation of finished screw-machine parts from the chips after the oil has been extracted. The machine will separate parts as small as 0.063 in. in diam. by $\frac{3}{16}$ in. long at the rate of about 5,000 pieces per min., it is claimed.

It blows chips into a box at

the rear, and lets the finished parts fall into a separate box. A bushel of parts can be handled in a minute. Belt drive can be furnished. Dimensions: 5½ ft. by 40 in. by 21 inches.

Finishing Equipment

— 164 —

Airfinishing Booths and Equipment

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill. [Vol.69,p.708]

This booth is made from sectional steel panels, is spot welded to angle-iron frames, and is convertible into larger and smaller sizes. The ventilating apparatus at the upper right-hand corner is the No. F493 ventilating unit described in Vol.69,p.633, of the *American Machinist*. Below the ventilating unit will be seen the air-conditioning unit.

The vapor-proof reflector is of an approved type. The sectional collector baffles pick up all solids, allowing only the gas to escape through the piping. The square-type standard booths are furnished 6 ft. 6 in. high and from 2 to 8 ft. on a side by 1-ft. increments.

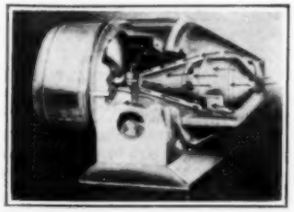
The air-conditioning unit supplies clean, dry, and warm air to insure best finishing results.

— 165 —

Ventilating Unit for Paint Booths Explosion-Proof

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill. [Vol.69,p.633]

This explosion-proof ventilating unit is intended for use with air-spray finishing booths.



It is adjustable to four mounting positions. The motor is fully inclosed, and is mounted on top of the booth. The air passes through the screen and over the motor. This ventilating unit is made in four sizes, ¼-, ½-, 1- and 2-hp., giving average displacements of 3,000 4,000, 9,000 and 15,000 cu.ft. per min. Motors are available to operate on 220- or 440-volt, 2-phase circuits, and 110- or 220-volt single-phase circuits, and the same voltages on direct current.

— 166 —

Spray Gun, Type E F

Alexander Milburn Co., 1416 W. Baltimore St., West Baltimore, Md. [Vol.69,p.173]

Any desired spray can be obtained instantly by adjusting a dial placed near the nozzle. The volume may be varied by means of an adjustable plunger, which

is provided with a series of indicator numerals. Both the dial air-control valve and the plunger have been made to fit both the Type E and Type EF spray guns.

— 167 —

Airbrush, Pressure-Feed, "Lo-Hi"

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill. [Vol.69,p.218]

A wide range of spraying operations can be performed by the use of interchangaable adjustable spraying heads. These "Multipleheads" are made in many sizes so that all paints can be handled. The width of spray is variable over a wide range. Air at 6- to 125-lb. per sq.in. is used.

The airbrush is mounted on a

cover interchangeable on a 1-pt. or 1-qt. feed cup. Lumps or skins can be blown back and out of the paint inlet. The two-finger steel trigger gives light control. All working parts are of hardened steel, while the body is of brass.

— 168 —

"Sprayit," Electric, "Superior"

Electric Sprayit Co., South Bend, Ind. [Vol.69,p.338]

This device is designed for the application of paints, enamels, varnishes, lacquers, and shellac.

Air is supplied to the nozzle from the self-contained, direct-connected rotary compressor, the rotor of which is mounted on the armature shaft of the motor. This three-bladed rotor is self-lubricated. The pressure developed is stepped up in the specially designed fluid tip and nozzle, to a point sufficient to handle practically any type of spraying material.

— 169 —

Paint-Spraying Gun, "Lectrospray"

Weil Lectrospray Co., 2648 East 4th St., Detroit, Mich. [Vol.69,p.635]

Sufficient air pressure is applied to the nozzle of this gun to spray effectively any finish, including lacquers, paints, and bronzes. The apparatus consists of a paint-spraying gun and

a motor-compressor unit connected to the gun by means of hose. The nozzle may be adjusted to regulate the density of the spray from a light mist to as heavy an application as is desired. Separating the motor-compressor unit from the paint-spraying gun permits easier control of the spraying operation, according to the manufacturer.

Heat-Treating Equipment

— 170 —

Furnace, Heat-Treating, Electric, Pot-Type

Harold E. Trent Co., 439 North 12th Ave., Philadelphia, Pa. [Vol.69,p.35]

Quick response to heat is characteristic of this line of units. The furnace shown is typical of the PF-300 and PF-500 sizes. The heating element is placed in an annular cavity. Terminal boxes are arranged for single, two-, or three-phase circuits, according to the size and requirements. The voltages that may be used are 110, 220 or 440. The crucible is not recommended for temperatures above 1,700 deg. F. It is supported on a casting.

Sturdy insulators support the heating element. These insulators interlock when placed in

position, and the space behind them is filled with an insulating powder. The terminals are of strip "Nichrome" welded to the unit.

— 171 —

Furnace, Pot, Electric, Industrial-Type, Model L

Sentry Co., Taunton, Mass. [Vol.69,p.447]

This Model L electric pot furnace is intended for industrial production heat-treating in lead, salt, and cyanide up to 1,600 deg. F, and for melting soft metals. It is manufactured in three sizes having ratings of

16, 25, and 35 kw. at 220 volts. The depth of the pots are 16, 18 and 20 in. The furnace has two semi-circular cover sections hinged to the top plate. The casing is of heavy steel plate.

Either alloy or steel pots may be suspended in the furnace cavity. The heating element consists of heavy, Nichrome ribbon wound in a double helix, the outer and inner coils being staggered, thus giving the effect of a solid wall.

Automatic control equipment consists of an indicating or recording, control pyrometer, Chromel-Alumel thermocouple, nickel or alloy protection tube, relay, and magnetic contactor.

— 172 —

Furnace, Resistance Type, Direct-Heat

Harold E. Trent Co., 439 North 12th St., Philadelphia, Pa. [Vol.69,p.788]

Four standard round sizes of this direct-heat furnace have been placed on the market. They are similar in construction to the pot type described on page 35, Vol. 69, of the *American Machinist*. A high-temperature-proof, alloy-steel guard is provided to protect the heating element and the insulation against damage when loading and unloading the furnace while in operation.

The chief feature of these

furnaces is the fact that they can be put on the power line without transformers and can be used on 220- and 440-volt a.c. circuits, either two- or three-phase. Safety fuses are provided with the furnaces. In addition to the round type, rectangular or oval shape pit-type furnaces varying from 24 to 84 in. in length have been built.

— 173 —

Furnaces, Resistance, Box and Pot, Type FR

Hoskins Manufacturing Co., Lawton Ave., at Buchanan St., Detroit, Mich. [Vol.69,p.825]

Five box types and one standard pot type of the "FR" furnace are available. The box type is available in standard cross-sections as follows: 12x8 in. in lengths of 18, 27, and 36 in., and also cross-sections of 20x13, 28x13, and 28x21, and 28x29 in., in lengths up to 8 ft., in increments of 1 ft. The ratings of the box-type furnaces

range from 12½ to 70 kw. The standard pot-type furnace accommodates a 15x15 in. container, suitable for babbitt, tin, lead, and cyanide.

The furnace operates directly on the line without a transformer. The "Chromel" floor plate is in one piece. Chromel ribbon units are placed on all four sides.

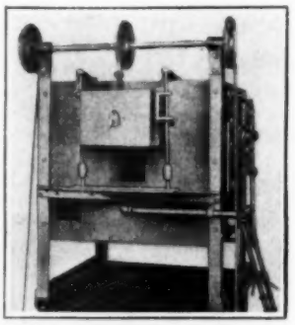
— 174 —

Furnace, Improved, for Hardening High-Speed Steel, HG No. 31

C. I. Hayes, 129 Baker St., Providence, R. I. [Vol.69,p.1018]

Apparatus for controlling the chamber atmosphere has been applied to this furnace. An inert or reducing atmosphere is maintained, a curtain of gases being projected across the furnace opening.

The furnace is designed for use on single-phase a.c. circuits with a transformer at any standard voltage up to 600. It may also be used on d.c. circuits at either 110 or 220 volts. Only one size of heating chamber is available, which is 6 in. high by 5 in. wide, by 12 in. in



length. The maximum temperature obtained is 2,500 deg. F., and the power input is 18 kilowatts.

Heavy boiler-plate construction is used for the case. The hearth is raised approximately 30 in. above the floor level.

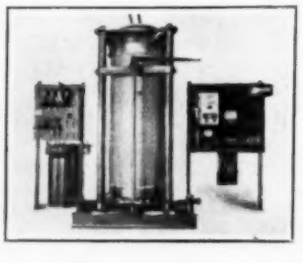
— 175 —

Furnace, Hardening, Electric-Magnetic, "Wild-Barfield"

Hevi-Duty Electric Co., Milwaukee, Wis. [Vol.69,p.560]

All steels having above 0.4 per cent. carbon content can be hardened in this electro-magnetic furnace, which was developed in England. It is manufactured under license for the United States, Canada and Mexico by the above company. Both horizontal and vertical types are available.

The primary winding furnishes the heat, and secondary winding is electrically connected to a magnetic indicator on the switchboard. As the temperature rises, the steel loses its ability to induce magnetism. Therefore, the indicator needle on the switchboard moves to zero, at which point the operator quenches the work. The furnace temperature is controlled by rheostats.



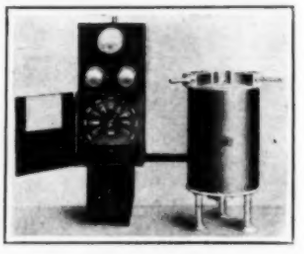
— 176 —

Furnace, "Wild-Barfield," Improved

Hevi-Duty Electric Co., Milwaukee, Wisc. [Vol.69,p.1019]

An improved electro-magnetic furnace of the "Wild-Barfield" type has been placed on the market by the above company. Other furnaces of similar design are noted in the preceding item. The unit is equipped with electrical circuits to establish a magnetic field through the work and a meter to measure the strength of this field, thus indicating the state of the charge. When the steel is heated to the critical point throughout its entire mass it loses its magnetism, and therefore the meter needle returns to zero.

This furnace is suitable for



heat-treating all carbon steels having more than 0.4 per cent carbon, and alloy steels whose critical temperatures are below the safe working limits, with the exception of high-speed steel.

— 177 —

Heat Exchanger, Thermo-Syphon

American Gas Furnace Co., Elizabeth, N. J. [Vol.69,p.710]

For use in conjunction with its carburizing equipment, a thermo-syphon heat exchanger has been developed by the above company. This apparatus permits of an extensive heat recovery by preheating a cold charge of work, and furthermore increases the capacity of the carburizer. It is provided with two chambers, one for the hot charge and one for the cold charge. Fan circulation of the trapped air provides a rapid transfer of heat. The exchanger is built in three sizes having

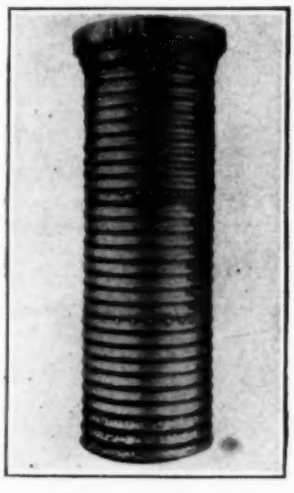
heating chambers whose dimensions are as follows: 30 in. in diam., by 30 in. deep; 15 in. in diam., by 30 in. deep, and 24 in. in diam., by 48 in. deep.

— 178 —

Pot, Annealing, Stainless-Steel, "Fuzon"

Fusion Welding Corporation, 103rd St. and Torrence Ave., Chicago, Ill. [Vol.69,p.903]

After having been in the furnace for seventy-five times, the "Fuzon" stainless steel annealing pot had no cracks at the welds and no scaling had taken place, according to the manufacturer. The pot weighs only 660 lb., although 7 ft. high and 24 in. in diam. The shell is made of



14-gage stainless iron, and it has a wrought steel base and a wrought steel collar. Eight ½-in. carbon steel rods are welded to the collar and to the baseplate to take the strain. A steel plate is welded inside of the pot so that the coils of wire, for the heat-treating of which the pot was particularly designed, can be removed easily. The shell is first formed and riveted before being welded tight.

— 179 —

Pot for Hardening Furnaces, Corrugated

Hevi-Duty Electric Co., Milwaukee, Wis. [Vol.69,p.1015]

Productive capacity of lead and cyanide hardening furnaces can be increased by the use of this corrugated pot, which has approximately 30 per cent more heat releasing and receiving surface than a straight-side pot of equal holding capacity. Because the corrugated surface

absorbs heat so rapidly, the coils of the furnace operate at lower temperatures, and the heating time is materially reduced.

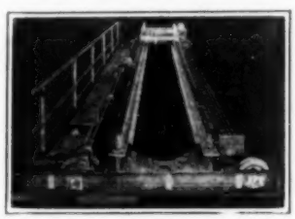
Material Handling Equipment

— 180 —

Crane, Traveling, Overhead, Arc-Welded

Cleveland Crane & Engineering Co., Wickliffe, Ohio. [Vol. 69,p.220]

Arc-welded joints are a feature of this crane. The girder is reinforced by angles arc welded to standard I-beam sections, and is attached to the end trucks by the notched or shoul-



der construction designed to prevent weaving.

The end trucks are built up of two standard channel sections joined by arc welding. Roller bearings are used. Each trolley frame is made of a standard channel with arc-welded braces under each bearing point. This method is also used to fabricate the gear guards, and to join the hand rail on the foot bridge and to build up the bearing supports on the bridge drive shafts.

— 181 —

Hoist, Differential, "Blue Boy"

Chisholm-Moore Hoist Corporation, Cleveland, Ohio. [Vol. 69,p.74]

This hoist is equipped with the "Hercules Inswell" electric-welded load chain, which gives it a high degree of safety. The chain is copper plated and the load sheaves are extra heavy. Malleable iron yokes are used and a drop-forged hook is a feature.

The "Blue Boy" hoists are

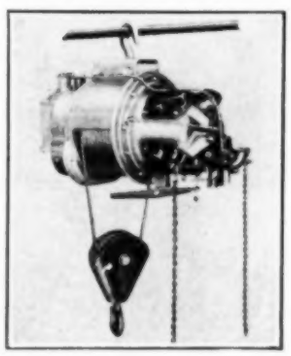
built in capacities from ½ to 3 tons and will lift through 6 and 10 ft. for the smallest and largest sizes, respectively.

— 182 —

Hoists, Air, Type "CP"

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. [Vol.69,p.257]

These three hoists have capacities of 2,000, 3,000 and 4,000 lb., respectively, and have inclosed-type load blocks. The air motor used is of the four-cylinder, single-acting type. The



balanced air valve has positive control.

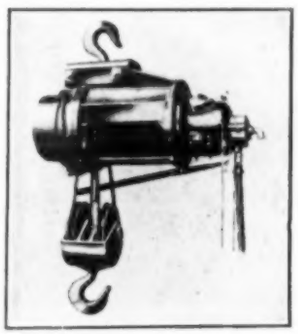
The 1-ton size will lift 2,000 lb., at a speed of 40 ft. per min. Other features of the line include casehardened steel reduction gears, crankshaft running in ball bearings, asbestos brake lining, and Alemite lubrication.

— 183 —

Hoist, Air-Motor, 10-Ton, Size G

Ingersoll-Rand Co., 11 Broadway, New York, N. Y. [Vol. 69,p.258]

This size G air-motor hoist, having a capacity of 10 tons, employs a four-cylinder air motor geared to a rope drum, all inclosed in a compact and



dustproof housing. Special heat-treated steel gears operate in a bath of semi-fluid grease. Either ball bearings or bronze bushings are provided where needed. The maximum lift is 16 ft. The hoist cable is $\frac{5}{16}$ in. in diam. and 83 ft. in length.

A graduated throttle gives complete control of the hook movement. An automatic brake is incorporated in the balanced motor, and it holds the load at any desired position for any length of time, regardless of the air pressure.

The hoist can be furnished with either a top hook or a chain-driven trolley, as standard. When equipped with the former, the weight is 1,300 lb., with the latter, 1,800 pounds.

— 184 —

Trucks, Electric Lift- and Crane-Types, "Lift-Tructor"

Elwell-Parker Electric Co., Cleveland, Ohio. [Vol.69,p.826]

Loads up to 1,500 lb. may be hoisted on to a skid, and the skid with a total load of 6,000 lb. lifted and transported to the desired point by means of this "Lift-Tructor." The crane hoist motor receives its power from the same battery that drives the tractor and operates the platform lift motor. Crane loads may be picked up over the end of the platform or 90

deg. to either side, and the skid load may be transported at a rate of 3 to 5 miles per hour.

The crane swivels on ball or roller bearings, and the boom may be raised or lowered by power. Steering connections are of the ball-and-socket type, and are set high enough to afford ample clearance over crowned roadways.

A crane tractor is also available for hauling trailers, and provides facilities for loading the trailers drawn behind. The platform is 41x80 in., and is fixed. It is available for direct loading up to 6,000 lb. and crane loads up to 1,200 lb. can be handled.

— 185 —

Truck, Electric, Tilting, Articulated, Type D-96

Baker-Raulang Co., West 80th St., Cleveland, Ohio. [Vol. 69,p.903]

This storage battery truck will load 10-ton packages of sheet steel into box cars without breaking through the car floors. The truck is hinged in the center, thus enabling it to make a very short turn from the loading dock through a 6-ft. car door with a package as large as 48x102 in. Sheets larger than this can be handled, but automobile cars with 10-ft. door widths are required. The truck will pick up such a package direct from the floor, but in order to attain the maximum tonnage, the packages should be placed on the truck platform

by means of an overhead crane.

The truck will load approximately 500 tons of sheet steel in a 10-hour day, putting a package weighing from 6 to 10 tons into a car in from 10 to 12 min. The same truck may be used for unloading the cars, the cables pulling the package up onto the truck platform.

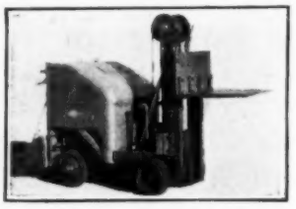
The power section of the truck carries the battery and the driving and steering apparatus. The load section consists of a tilting platform mounted on a single axle, and includes the hoist for tilting the platform and a double-drum power winch. The crane is of the revolving and luffing type, and is provided with a double-drum hoisting unit driven by a separate motor.

— 186 —

Truck, Electric, "Tructier"

Clark Tructractor Co., Battle Creek, Mich. [Vol.69,p.1018]

A wide variety of tiering and transporting operations can be performed by means of the Clark "Tructier." The machine illustrated is provided with a platform. However, a ram or steel fingers can be applied to the vertical plate. The platform type will elevate 1 ton to a height of 3 ft. 2 in. The stand-



ard platform is 26 in. wide by 30 in. long. It may be stopped and the direction of motion changed at any point in its travel.

The ram type is provided with a ram 30 in. in length and 3 in. in diam. The minimum height of the ram from the ground is 12 in., and the maximum height 50 in. It has a capacity to lift 1,500 pounds.

The unit is propelled by a gasoline engine, and has a speed of 6 miles per hour in either direction.

— 187 —

Truck, Hand, Side-Lift, "Blue Streak"

Stubing-Cowan Co., Cincinnati, Ohio. [Vol.69,p.942]

Loads up to 2,500 lb. can be transported on the "Blue Streak" side-lift truck. The handle is arranged so that it may be swung 45 deg. either side of the axis to permit loading in a limited space. A positive hydraulic check is provided. The lift hook and pedal are

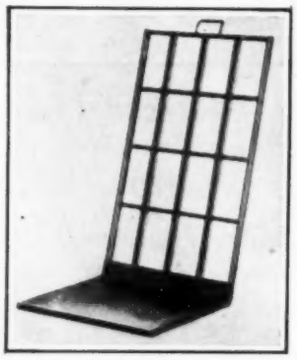
drop forgings. The positive lock and release pedal cannot become disengaged, except when tripped with the foot. Frame members are made of heavy steel bar. Hyatt roller bearings are provided.

— 188 —

Carrier for Hand Trucks, "Tru-Pak"

American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa. [Vol.69,p.670]

Flexibility comparable to that supplied by trailers, lift trucks, and skids is given to the ordinary hand truck equipment by the use of this carrier, which is



built entirely of steel. The deck is of steel plate, and is welded to two steel forgings. These are bent upward and are welded to the inside of the channels that form the back. Cross bars are of channel section, and the longitudinal straps are flanged. The deck is raised far enough above the floor to make room for the truck nose to enter without lifting or disturbing the load.

— 189 —

Car Spotter, "IXL" Hygrade

Foote Bros. Gear & Machine Co., 215 N. Curtis St., Chicago, Ill. [Vol.69,p.749]

This electric-motor-driven car spotter has a reduction unit the same as used in the "IXL" vertical wormgear speed re-

ducer. Ball and roller bearings are used.

The device is furnished in two sizes, the smaller having a rope pull of 3,000 lb. and requiring a 5-hp. motor, and the larger having a rope pull of 6,000 lb., and requiring a 10-hp. motor.

— 190 —

Car Spotter, No. 17-J

Stephens-Adamson Manufacturing Co., Aurora, Ill. [Vol. 69,p.785]

This vertical capstan-type car spotter is intended for pulling industrial cars. It is mounted on a rigid steel base made of riveted channel irons, and the motor bracket is mounted on a steel plate. The bevel reduction gears are inclosed. The car spotter moves the car at the

rate of 30 ft. per min., while the capstan has a speed of 15 r.p.m. and exerts a 2,000-lb. pull on the rope.

Woodworking Machines

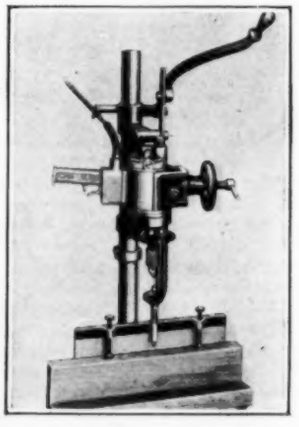
— 191 —

Mortiser and Drill, Bench

U. S. Electrical Tool Co., Cincinnati, Ohio. [Vol.69,p.522]

This double-duty tool will serve either as a portable or bench-type drill or as a bench mortiser. It will drill holes up to 2 in. in wood and up to $\frac{1}{2}$ in. in steel. It will mortise nine sizes of holes from $\frac{1}{4}$ to $\frac{3}{4}$ in. across and up to $5\frac{1}{2}$ in. deep. The speed under load is 450 r.p.m. on either alternating or direct current.

The machine is equipped with



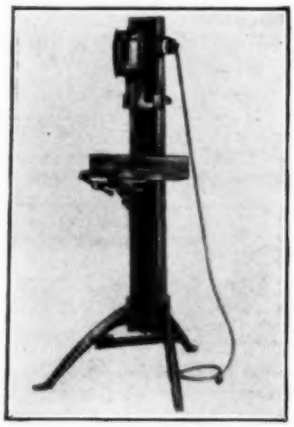
ball bearings, chrome-nickel-steel gears, and a two-pole trigger switch. It comes complete with stand, ⅜-in. hollow chisel and bit, collars for holding ¼- to ⅜-in. hollow chisels, 12 ft. of rubber-covered cable, and attachment plug.

— 192 —

Mortiser, Improved

DeWalt Products Co., Leola, Lancaster County, Pa. [Vol. 69,p.787]

Chisels up to ½ or ⅝ in. for soft wood can be accommodated, and material up to 14 in. may be handled. The stroke and depth of the cut can be adjusted easily. The table is operated by a handwheel, slides 12 in., and has in-and-out adjustment. It is 20 in. in length overall and



tilts to any angle, right or left. It is provided with scale and indicator. The chisel stroke is 5¾ in. The motor carriage is a combination roller and slide head, and is carried on a steel channel column. The tool is driven by a special ball-bearing ½-hp. motor for operation on 110- or 220-volt single-phase a.c. circuits.

Weight 260 pounds net.

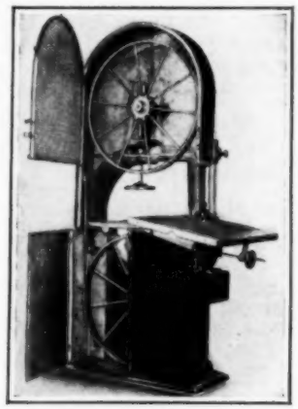
— 193 —

Bandsaw, Ball-Bearing, 36-Inch

Colladay Machine Works, Philadelphia, Pa. [Vol.69,p.519]

A cast-iron frame carries the table, which is 27 in. wide, 35 in. long, and tilts 45 deg. The wheels, which carry the saw, have rubber-covered steel rims. The shafts are mounted in precision ball bearings. The top wheel is equipped with spring tension, and is adjustable to line up the saw. The guide bar has spring counterbalance, and the distance under the guide is 15½ in. From the blade to the frame is 36 in. The saw blade travels at 6,300 ft. per min. usually. Blades up to 1¾ in. wide can be carried.

Either belt or motor drive is available. A built-in motor



drive can be furnished. It consists of a special 3-hp. motor operating on 220- or 440-volt, 2- or 3-phase, 50- or 60-cycle circuits. A ½-in. saw blade is furnished as standard equipment.

Weight, with belt drive, 1,750 lb.; with motor drive, 1,950 pounds.

— 194 —

Bandsaw, Three-Pulley

DeWalt Products Co., Leola, Lancaster County, Pa. [Vol. 69,p.823]

Capacity to handle material up to 7 in. and a throat depth of 20 in. are furnished. The saw is completely covered except for 8 in. exposed at the cutting point. The saw travels around three pulleys, the rear one being driven by a V-belt from a ½-hp. motor. The pulleys are ball-bearing mounted. Stops are provided to bring the table to exactly the position required.

The work table is 13¾ in. square and has a graduated sec-

tor to show the tilt. The table tilts to the right 45 deg. and to the left 3 deg. The machine is built upon a base, which may be attached to a floor stand or placed on a bench. Standard equipment includes two bandsaw blades, ⅜ and ½ in. wide, respectively.

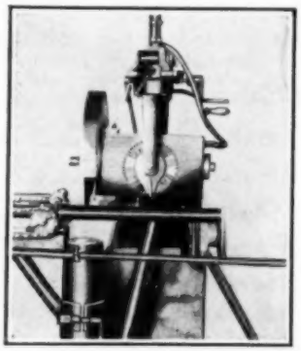
Weights; motor-driven bandsaw complete with floor stand, 210 lb.; without motor and floor stand, 120 lb., net.

— 195 —

Saw, Cut-Off, Overhead-Drive, "Wonder Worker"

DeWalt Products Co., Leola, Pa. [Vol.69,p.220]

Operations performed include crosscutting, ripping, mitering, dadoing, disk-sanding and grinding. The machine consists of a motor unit suspended in a



yoke, which slides in an arm. The motor may be tilted, and both the arm and the upright can be swung through a complete circle. The whole unit can be raised or lowered. These movements permit operation at any angle.

In addition, the machine is suitable for cutting steel tubing used in airplane manufacture, since it is adjustable to any angle. For such work, a 12-in. metal-cutting saw having hollow ground fine teeth has been found suitable.

Nine models are available. The motors operate on 110- or 220-volt a.c., 60-cycles. Capacities vary from 1 to 5 hp., and the saws are from 12 to 16 in. in. diam. Extra equipment consists of a control switch and table mounting.

— 196 —

Handsaw, Electric, "Little Alta"

Wappat Gear Works, Inc., Pittsburgh, Pa. [Vol.69,p.375]

Protection is afforded by the patented lower guard, which telescopes into the upper guard as the saw is pushed into the material. The machine is man-

ufactured in three models intended for plain cutting, bevel cutting, and adjustable dado cutting, respectively. All models cut any depth up to 2 in. The handsaw will cut wood, soft metals, bakelite and fiber.

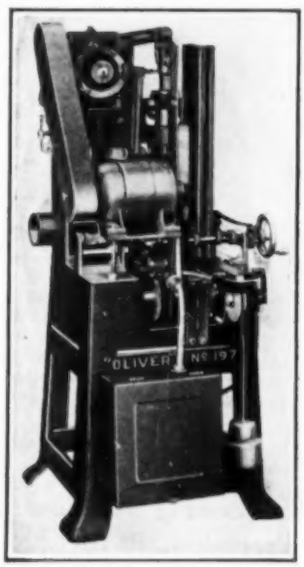
Power is furnished by a high-speed universal motor, fan-cooled and mounted on ball bearings. The saw shaft, mounted on tapered roller bearings, is driven by helical gears. The frame is of aluminum, highly polished, and all exposed steel parts are rust-proofed. A steel saw table 16x26 in. and 11 in. high can be furnished.

— 197 —

Wedge Cutter, Automatic, No. 197

Oliver Machinery Co., Grand Rapids, Mich. [Vol.69,p.482]

Various kinds of wood can be cut into wedges that do not require further finishing. Wedges up to 3 in. long, 1¼ in. wide, and tapering from a point at one end up to ½ in. thick at the other end, can be produced. The stock used consists of crosscut strips, the thickness of which



will form the thickness of the wedges, and the length along the grain will be the length of the wedge desired. These strips may be any size up to 10x3 in. Material of various widths can be fed simultaneously into the magazine, this feature affording great convenience in operation.

Two motors operate this wedge cutter, a ¼-hp. motor for the feed, and a ½-hp. motor for the saw. They are suitable for either a.c. or d.c. operation on 110- or 220-volt circuits.

The feed mechanism is adjustable for various widths of work. Cutting of the wedges is performed by a 7-in. saw mounted on the high-speed motor, the position of which can be varied to suit the taper desired. All moving parts of the machine are guarded and an exhaust hood is built in. Alemite lubrication is used on all moving parts.

Floor space, 30 in. sq., height, 5 ft., weight, 520 pounds.

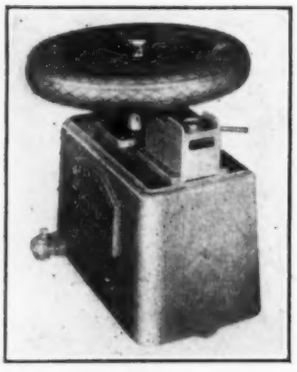
Balancing, Gaging and Testing Equipment

— 198 —

Balancing Machine for Automobile Wheels, "Micro-Poise"

Commerce Pattern Foundry & Machine Co., 2211 Grand River Ave., Detroit, Mich. [Vol. 69,p.220]

Automobile wheels equipped with or without tires can be balanced on this machine. The work is placed on the machine, the operating lever is moved,



and a universal level shows instantly the angle of unbalance. Compensating weights are then placed on the rim. Production is quoted at 60 balanced wheels per hour.

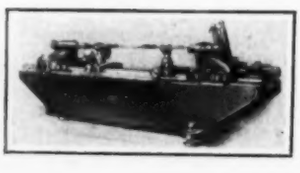
— 199 —

Measuring Machine, Precision, 40-Inch, Zeiss

George Scherr Co., 142 Liberty St., New York, N. Y. [Vol.69,p.561]

Both external and internal measurements, either absolute or comparative, may be obtained by the use of this machine, which is built by Carl Zeiss, Jena, Germany. The measuring elements are a graduated glass rule and an optical indicator. The graduation is brought into plain view through the aid of a microscope, the deviation from the nominal value being determined by the optimeter.

The graduation of the glass rule consists of 800 intervals, each 0.0005 in. apart. The fractions of each interval are determined by the optimeter, the scale of which has a range of plus or minus 0.0005 in. subdivided into 1/20,000 in., and 1/100,000 in. can be estimated easily.



The bed of the machine is heavily ribbed and carries both headstock and tailstock, as well as roller supports for holding end rods and a table for blocks and plug gages. The headstock runs on balls, likewise the table, which is of the floating type.

— 200 —

Measuring Machine, Two-Co-ordinate, Société Genevoise

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol. 69,p.706]

Measurements in two co-ordinates can be made on this machine by sighting on the object with a microscope having a reticle of parallel or crossed spider threads. The machine is manufactured by the Société Genevoise d'Instruments de Physique, Geneva, Switzerland. The object to be measured is placed on a table, which can be moved 16 in. by means of a micrometer screw. The microscope is carried on a slide,

which moves across the table through a range of 4 inches.

The table has a large rectangular opening so that photographic plates and the like may be measured by light reflected from below. A long stage is provided on the table, and is pivoted at one end. The table is adapted to the support of special gages, cams or templets, parts of instruments, and steel scales. By means of a semi-automatic center-punch device, the laying out of irregular curves, of which the co-ordinates are known, can be done. Errors of direct readings are less than 0.0001 in. at any point throughout the length of the micrometer screws. The micrometer heads are graduated 0.0005 in., and by verniers are read to 0.00005 inch.

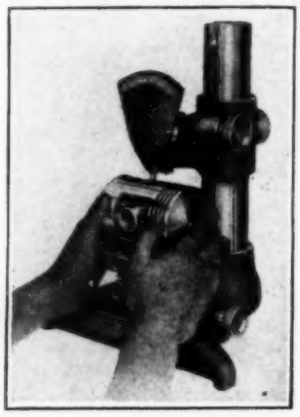
The microscope is of the "bent" type. Two objectives and three eyepieces are provided regularly to give total magnifications of 7.5, 17 and 35 times, respectively. In addition, a goniometric eyepiece is supplied for the microscope.

— 201 —

Comparator, Amplifying

B. C. Ames Co., Waltham, Mass. [Vol.69,p.866]

Measurements of round, flat and odd-shaped parts can be compared with known standards on this amplifying comparator. The amplifying scale separates



readings of ten-thousandths by $\frac{1}{10}$ of an in., and total variations of plus or minus 0.001 in. are provided for. Work up to 8 in. in diam. can be tested throughout its entire length. The apparatus lends itself to production testing.

Special shapes and sizes of platens and V-blocks can be supplied for the device. The diamond in the measuring point is rounded, and will not scratch nor mar the work. Pressure exerted by the point is light.

Height 16 in.; weight 70 pounds.

— 202 —

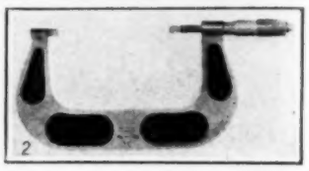
Micrometers, Blade- and Disk-Anvil

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol. 69,p.521]

The disk-anvil type is used for measuring the thickness of forms on forming tools. It has special disks on its anvil and spindle ends to take measurements in places inaccessible to regular micrometers. Measurements of forms up to $\frac{1}{4}$ in. deep and over 0.020 in. wide can be taken.

Thin blades on the ends of the anvil and the spindle of the blade micrometer enter the narrow slots and grooves of forming tools. Measurements of the depth of slots up to $\frac{1}{2}$ in. can be made.

The disk-anvil micrometer is made in one size having a range from 0 to 1 in. by thousandths. The blade anvil micrometer is



made in four sizes, the first having a range of 1 to 2 in. by thousandths, and the last a range of 3½ to 4½ in. by thousandths.

— 203 —

Micrometer for Comparing Screw Threads, No. 210

L. S. Starrett Co., Athol, Mass. [Vol.69,p.668]

Screw threads may be compared with the standard by means of this micrometer. The anvil and spindle contacts are conical in shape, but are flat-

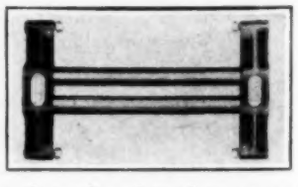
tened for about $\frac{1}{64}$ in. The micrometer does not measure the actual diameter of a V-thread. It comes in two sizes, the first having a range of from 0 to 1 in., and the second from 1 to 2 inches.

— 204 —

Gage, Snap, Shoulder, Adjustable-Limit

Standard Gage Co., Inc., Poughkeepsie, N. Y. [Vol.69,p. 979]

Double supports, eliminating spring in gaging, is the main feature of this adjustable-limit shoulder snap gage. The two supports are of steel tubing attached rigidly to the head. The



gaging pins for the external gage are flat, while those for the internal gage have ball points. The pins are held securely in the heads by the "Standard" patented locks.

The gage has a ½-in. range of adjustment after setting. Range of sizes regularly furnished is from 4 to 24 in., but larger sizes are made up as required.

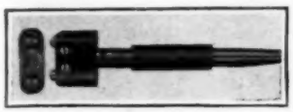
— 205 —

Gage, Pin, Adjustable-Limit

Standard Gage Co., Inc., Poughkeepsie, N. Y. [Vol.69,p. 981]

This gage incorporates the adjustable feature of the ordinary limit pin gage and, in addition, has the feature of the fixed "go" and "no go" gage, which eliminates the dependence on "feel."

The pins are adjustable for wear and for size within the



range of the gage. They are held rigidly by a patented pin-locking device. The gage measurement is taken from the fixed end of the gage radially to the pins, and in checking internal measurements, a simple rocking motion can be used by the operator.

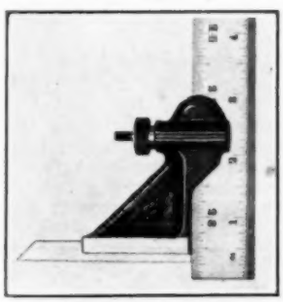
The regular stock sizes of the gage run from 4 to 24 in., but gages for larger internal diameters are made on order.

— 206 —

Gage Attachments, Height, Nos. 465A and 465B

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.69,p.375]

These attachments are used for making comparative measurements and finding heights or projections from plane surfaces. The No. 465A is for use with combination squares and sets having 9-in. blades, and the



No. 465B is suitable for blades 12, 18 and 24 in. in length. Neither attachment can be used with sets having heavy blades.

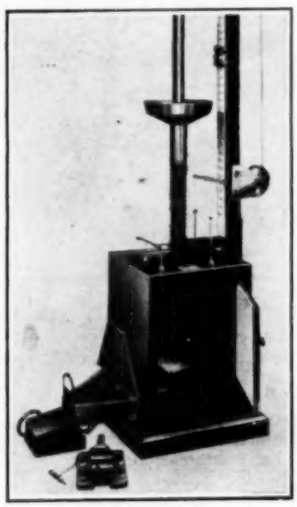
The measurement is read directly from the square by means of the pointer blade. The attachment may be used in all positions from the extreme top to the bottom of the blade, and is reversible. The frame is drop forged, and has a smooth japanned finish. The pointer is made of steel, hardened, tempered, and ground.

— 207 —

Hardness Tester, Production, 8-Inch, "Cloudburst"

Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa. [Vol.69,p.411]

Production hardness testing of the entire surface of specimens up to 8-in. square can be performed with this machine, which was developed and patented by E. G. Herbert, of England. It is manufactured in this country by the above company. The surface to be tested is exposed to a rain of 10,000 to 20,000 steel balls, which are 3 mm.



in diam. The height from which the balls are permitted to fall is arranged so that their impact is sufficient to mark the surface of the specimen if it is below a specified degree of hardness. No direct measurement of the hardness is given, and it is necessary to employ a projection microscope specially provided for this purpose. See item No. 211.

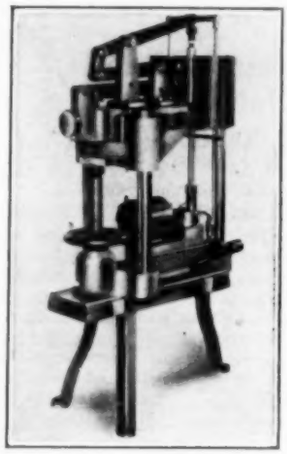
The tester consists of a rubber-lined box inclosing a swinging platform on which the work is placed. A clear fall of 4 meters can be had. The exact height is determined by a perforated adjustable piston inside the tube, the balls dropping from the center of the piston.

— 208 —

Hardness, Testing Machine, "Precision"

Pittsburgh Instrument & Machine Co., 1026 Reedsdale St., Pittsburgh, Pa. [Vol.69,p.521]

This power-operated instrument was developed and patented by H. M. German, chairman of the Hardness Testing Committee, American Society for Steel Treating. The tester utilizes a system of weights and levers to give the load, which is applied gradually throughout 8 sec. The



load is then permitted to rest for 30 sec., after which it is released gradually. Time values for these various operations were determined by the Hardness Testing Committee of the A.S.S.T.

— 209 —

Testing Machines, Hardness, Lever-Operated, Types E and F

Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa. [Vol.69,p.1013]

These machines are similar in their general design, the main difference being that the type E has a mandrel in the column for testing tubes and rings. Each

type has capacity for weights up to 3,000 kg. for Brinell hardness testing, but weights of 500 and 1,000 kg. can be substituted. The type F machine has a gap of 3½ in. and will accommodate parts up to 6 in. in diameter. It is slotted at the base for testing valves. The Type E machine, illustrated, is provided with a gap of 5 in. and will test work up to 9 in. in diam. All moving parts work on ball bearings.

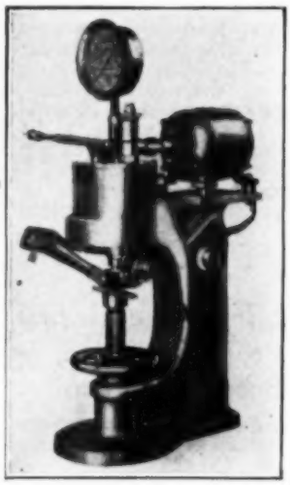
The load may be kept on the specimen any desired length of time by means of the retaining pawl. For thin articles a 5-mm. ball is recommended, and may be obtained extra.

— 210 —

Attachment for Hardness Testers, Direct-Reading, Brinell

Pittsburgh Instrument & Machine Co., 1026 Reedsdale St., Pittsburgh, Pa. [Vol.69,p.826]

Limit marks on the graduated screen of this direct-reading attachment are intended to show quickly to the operator whether or not the material under pro-



duction test is within the specification for hardness. The device is imported from Germany, and is attached to the power-operated Brinell hardness tester, which is an improved model of the machine described on page 594, Vol. 61, of the *American Machinist*.

The screen has a movable glass scale upon which the shadow image of the ball impression is cast by the optical arrangement. The diameter of the impression is read from the scale.

— 211 —

Microscope, Projection, Herbert

Tinius Olsen Testing Ma- Co., 500 North 12th St., Phila- Philadelphia, Pa. [Vol.69,p.411]

This projection microscope is intended for use with the Herbert "Cloudburst" production hardness tester described in Vol. 69,p.411, of the *American Machinist*. It was developed and patented by E. G. Herbert, of England, and is manufactured in this country by the above company. It is used for the direct measurement of the actual hardness of specimens tested in the above machine. A magnification of 20 times is given to the indentation, thus preventing eyestrain.

The special feature of the apparatus is a large ruled screen upon which the image of the in-

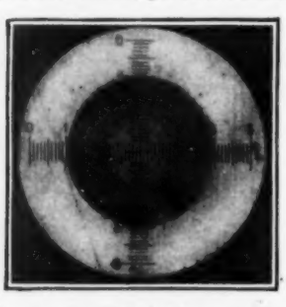
dentation is projected. For testing maximum and minimum hardness, two sets of diagonal lines are ruled on the screen, one set being spaced to represent maximum hardness, and the other minimum hardness. If the image is within the longer dimension and is greater than the short dimension, the area under consideration is within the hardness limits specified.

— 212 —

Microscope, Brinell, Projection-Type, Busch-Schumann

Paul F. Hermann Co., Keenan Building, Pittsburgh, Pa. [Vol.69,p.1014]

Sharp focussing of the ball impression on a ground-glass screen, even though the rim of the impression is lipped, is the feature of this microscope, according to the manufacturer. The instrument permits reading



the screen with both eyes, thus preventing fatigue. It is about 12 in. long, and may be placed in tight places because of its size. The two diameters of the impression are measured on the screen to an accuracy of 1/320 of an inch or greater with the help of the cross-scales. Diameters of ¼ in. or 6 mm. can be measured. The edge of the crater is revealed with equal sharpness even though the rim bulges.

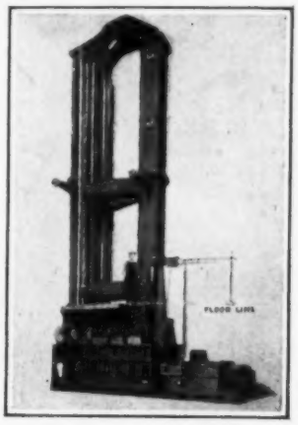
The upper part of the tube is interchangeable with an angle piece carrying a vertical ground-glass slide which permits Brinell tests on the inner walls of hollow cylinders having a minimum internal diam. of 8¾ in. Photographic records can be made by the use of the necessary accessories.

— 213 —

Testing Machine, Universal, 2,000,000-Pound

Riehle Bros. Testing Machine Co., 1424 N. High St., Philadelphia, Pa. [Vol.69,p.518]

This 2,000,000-lb. testing machine was developed for testing cables to be used on the Hudson River bridge. The capacity is sufficient to pull apart a bar of structural steel 6 in. square or to crush a cast-iron column 15 in. in diam., 15 ft. long, and having 1¼ in. walls. At full motor speed the pulling head



may be operated at speeds of 10, 2, 0.5 and 0.1 in. per min. The machine weighs about 275,000 lb., and is 42 ft. 10¾ in. high. Its extreme width is 13 ft., and its length is 21 ft. The maximum length of specimen that can be tested is 25 ft., with a clear space of 75 in. between the screws.

Power is derived from a 75-hp., adjustable-speed motor, running at 800 to 1,600 r.p.m. Drive is through a silent chain, fully inclosed, and having an individual lubricant pump. Remote control equipment and a tachometer are all mounted on the panel board.

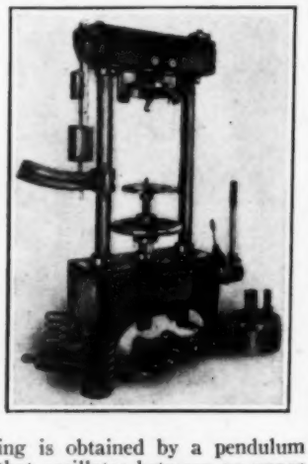
The automatic recoil apparatus is of the hydraulic type. A weighing beam of the conventional type is used.

— 214 —

"Elasticometer," Type D

Coats Machine Tool Co., Inc., 110 West 40th St., New York, N. Y. [Vol.69,p.1016]

This unit is intended for the rapid inspection of springs on a production basis. Instead of piling up weights on the weigh beam as in the smaller unit described on page 996, Vol. 66, of the *American Machinist*, load-



ing is obtained by a pendulum that oscillates between an upper and lower scale, where the loads can be read directly. The amount of deformation of the spring is read off a scale, which indicates the distance between the compression plates or the tension hooks.

Four models of the Type D units are made, being capable of taking loads up to 224, 448, 1,120, and 2,240 lb., respectively, and being designated by their corresponding kilogram ratings, as D-100, D-200, D-500, and D-1,000. There are three types of hand drive used, according to the load range.

All these machines are intended only for hand operation, power being transmitted through the knife edges and links. Three sizes of each model are manufactured. The maximum distances between pressure plates for the three sizes of all four models are 18, 24, and 30 inches.

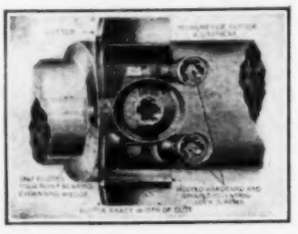
Small Tools

— 215 —

Boring Tool, Expansion, Type L, Improved

Davis Boring Bar Co., Div. of the Larkin Packer Co., 2600 Maple Ave., St. Louis, Mo. [Vol.58,p.298]

This tool was formerly made by the Larkin company. It was previously described as "Larkin Expansion Boring Bar," on p. 438, Vol. 68, of the *American Machinist*. Refinements include the use of socket-head set



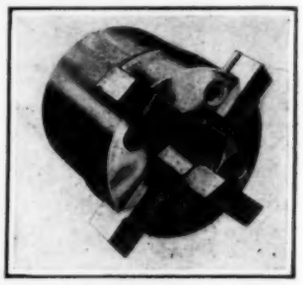
screws of standard type, and cutter slots taking cutters interchangeable into the bar slots of the old style Davis expansion boring tool. Wedge action, with a bearing above and below the center on the angle of the cutters, forces the cutters uniformly outward as the micrometer screw is turned.

— 216 —

Boring, Head, 4-Point

McCrosky Tool Corporation, Meadville, Pa. [Vol.69,p.370]

Four high-speed steel blades are locked rigidly in the hardened body of this tool by means of pins embedded in mating grooves in the blades and the



body. A hollow set-screw bears against each pin and locks it in place.

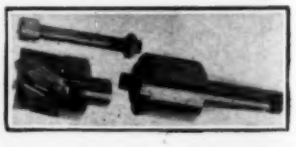
Boring bars, having a diameter of 3 in., have a radial adjustment of ¼ in., while 6-in. bars have an adjustment of ½ in. The head can be made in sizes from 2½ in. up. This tool is made specially to order. The head can be used with a shell reamer mounted on a bar for roughing and finishing in one operation.

— 217 —

Counterbore, Heavy-Duty

National Twist Drill & Tool Co., Detroit, Mich. [Vol.69, p.751]

Rigidity of the cutter is due to the taper shank construction. To remove the cutter from the holder, a taper pin is driven into the half-round grooves in the



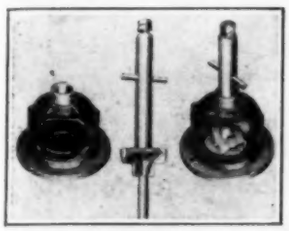
holder face. The driving lugs are placed at the maximum radius. The hole between the lugs is ground to fit the taper shank of the cutter. A nut is used to hold the cutter in place. Heavy spiral teeth on the cutter permit smooth, continuous cuts, with minimum power consumption. Counterbores from 1¼ in. and up can be furnished.

— 218 —

Counterbore, Special

Eclipse Interchangeable Counterbore Co., 7410 St. Aubin Ave., Detroit, Mich. [Vol. 69,p.174]

Inside bosses on differential gear mounts may be machined by the aid of these special tools, which are available in several sizes. The multi-diameter cutter is held inside the



malleable casting when the arbor is inserted through it, the arbor piloting in the finished hole above and in a bushing below. It rough reams the cored hole and countersinks and faces the bosses for differential side gears.

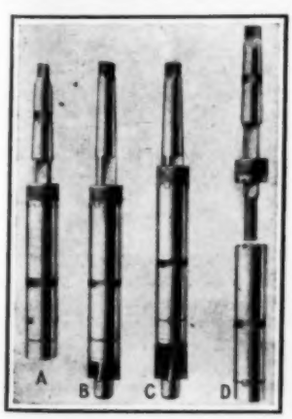
The radius cutter machines the concave surfaces of the bosses for differential pinion gears.

— 219 —

Counterbore Holder, Improved, Quick-Adjustable-Length

Eclipse Interchangeable Counterbore Co., 7410 St. Aubin Ave., Detroit, Mich. [Vol. 69,p.1010]

Quick and easy adjustment by hand is the important feature of the Types "R" and "SD" improved, quick-adjustable-length holders, which may be employed in gangs for multiple-spot facing, counterboring, countersinking, or core drilling, because of their small diameters. The Type R is illustrated at A and D, whereas the Type SD is illustrated at B and C. Adjustment of either type is made by lifting the small knurled locking col-



lar, revolving the body of the shank to the required length, and then re-engaging the collar with the body.

The Type R holder is suitable for right-hand motion only, with a variation in length of 0.004 in. per notch. The Type SD, which permits rotation in either direction, has a length variation of 0.008 in. per notch. The shank of the tool is square, and there are no loose springs or keys to work loose.

— 220 —

Cutters, Face-Milling, High-Power

Tindel & Phillips, 516 Commerce St., Philadelphia, Pa. [Vol.69,p.258]

No fastenings are required on the cutting blades of this rotary surfacer. They are held in place in the body by means of a drive fit, but can be driven outward

to take up wear. Square lathe tool design has been used for the blades.

These rotary cutters are built in sizes from 6 to 24 in. in diam., the number of inserted blades running from 11 to 28. The face and side cuts are $\frac{1}{2}$ and $1\frac{3}{32}$ in., respectively, for the smallest size, and $\frac{7}{8}$ and $3\frac{1}{16}$ in., respectively, for the largest size.

— 221 —

Cutters, Milling, Inserted-Tooth

National Twist Drill & Tool Co., Detroit, Mich. [Vol.69,p. 713]

Positive locking of blades is the chief feature of this cutter. According to the manufacturer, complete and universal adjustment enables the shifting of the

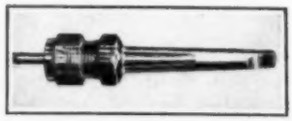
blades outward or sideways when they become worn. One side of the slot is made up of pyramids that match serrations in the blades. A locking wedge and a locking screw are used to hold each blade in place.

— 222 —

Chucks, "Save-Drill"

Sandusky Nut Co., Sandusky, Ohio. [Vol.69,p.376]

Both long and short straight shank drills can be held in this device, which consists of three pieces, a hexagon locking nut, a one-piece collet, and the body.



The shank may be taper or straight, according to requirements.

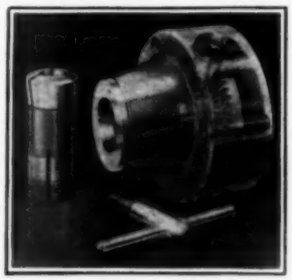
This chuck is made in four sizes. No. 1 will carry drills from 0 to $\frac{5}{16}$ in., and the diameter across the corners is 1 in. No. 4 will take drills from 0 to $\frac{3}{4}$ in., and is $1\frac{1}{16}$ in. across the corners. Collets can be furnished to fit the drills used. The chuck can be used to hold broken drill pieces.

— 223 —

Chuck, Collet, Nose-Type, No. 15

Cushman Chuck Co., Hartford, Conn. [Vol.69,p.1022]

The range of collet sizes that can be handled by this chuck is from $\frac{1}{8}$ to $1\frac{3}{4}$ in., by 32nds. The chuck is intended to be mounted on a spindle nose by bolting it



to an intermediate plate in the same way as for a lathe chuck.

The collet fits into the tapering wall of the chuck body, and is threaded so that it can be drawn into the body of the chuck by means of a disk having a bevel gear cut on one face. The body contains two ground bearings for the collet, one at the back and one at the nose.

— 224 —

Pliers, Open-End

Kant-Slip Plier & Wrench Co., 428 West 65th Place, Chicago, Ill. [Vol.69,p.174]

These self-adjusting pliers will work in small places, and provide a parallel grip for nuts

and pipe. A slight pressure on the handles causes the jaws to close by means of a cam and wedge action. The available lengths are 7, 9 and 12 inches.

— 225 —

Pliers, "Lok-Jaw"

Lawson Manufacturing Co., 2720 53rd St., Cleveland, Ohio. [Vol.69,p.179]

Compound leverage delivers a 1-ton grip at the jaws of these pliers. The tool is designed to fit round, square, or hexagon objects. Adjustment of the jaws

is maintained by a spring. They are of forged steel, hardened and tempered. The length of these pliers is 8 in., and the jaws open to $\frac{3}{4}$ inch.

— 226 —

Reamer, Nose-Driven

Gairing Tool Co., 1635 W. Lafayette Blvd., Detroit, Mich. [Vol.69,p.179]

Full-floating action of the reamer is accomplished by driving it from the nose, which is effected by means of a long driving member having rounded

hexagon ends that fit loosely into similarly shaped recesses in the tool and toolholder. A screw and washer hold the driver in place in the reamer, and the other end of the driver in the holder is prevented from pulling out by a screw. Two other screws limit the amount of sag to insure proper piloting.

— 227 —

Reamer, Nose-Drive, Inserted-Blade

Gairing Tool Co., 1635 W. Lafayette Blvd., Detroit, Mich. [Vol.69,p.750]

The blades of this reamer are supported on all sides over their entire length. The dovetail wedge slot in the reamer body is designed with an $8\frac{1}{2}$-deg. angle

in the cross-section and a 3-deg. angle in the longitudinal section. Blades are ground to fit this double-angle slot and are driven in place. When the reamer wears undersize, the blades are driven out and shims are inserted. Wear strips are provided on the rear portion of the reamer wherever it is necessary to guide the cutting blades over cored sections. A pilot is shrunk on the forward end of the reamer. Reamers from 2½ to 6 in. in diam. can be supplied.

— 228 —

Reamer, Structural, Spiral-Groove

Morse Twist Drill & Machine Co., New Bedford, Mass. [Vol. 69,p.1011]

Aligning holes with air or electric drills in the fabrication of steel members is the work for which this three-groove, spiral reamer was designed. It

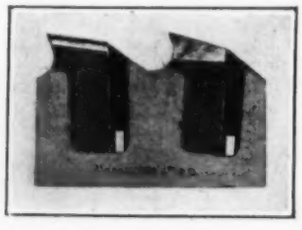
has a graduated taper and takes a shearing cut. Large chip area is provided in the flutes, and each flute has double clearance. Stock sizes range from $\frac{13}{32}$ to $\frac{29}{32}$ in., by 32nds and then to 1½ in., by 16ths.

— 229 —

Saws, Metal-Cutting, Inserted-Tooth, "Red Streak"

Simonds Saw & Steel Co., Fitchburg, Mass. [Vol.69,p.180]

Tool steel is used for the inserted teeth of these saws. The teeth are made seven sizes for both light- and heavy-duty cutting of materials from soft



brass to high-speed steel. The kerfs vary from $\frac{5}{64}$ to $\frac{3}{8}$ inch.

The teeth do not all have the same outline. Every other tooth is rounded on top, and is slightly higher than the next tooth. The rounded tooth cuts a groove. The next tooth, which is square on the top, cleans out the corners of the cut. Fast cutting is achieved through the use of curved gullets. The plate of the saw is composed of alloy steel. It is not necessary to remove the teeth for sharpening.

— 230 —

Wrench Set, Combination, No. 287, Williams-Husky

J. H. Williams & Co., Buffalo, N. Y., and the Husky Wrench Co., Milwaukee, Wis. [Vol.69,p.181]

This set for electrical work is available from either of the above companies through a reciprocal sales arrangement. The set combines open-end and socket wrenches. It contains

seven Williams "Midget Superrenches" in sizes from $\frac{7}{32}$ to $\frac{1}{2}$ in. Each wrench has two openings of the same size, but at angles of 15 and 75 deg. from the center line. These wrenches are chromium plated.

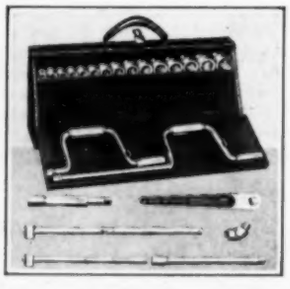
Eight Husky "Baby" sockets, tapered for work in close quarters and in sizes from $\frac{5}{32}$ to $\frac{1}{2}$ in., are included together with a 5-in. combination T and a 4½-in. handy grip.

— 231 —

Wrench Kit, Socket, Service, No. 696

Husky Wrench Co., Milwaukee, Wis. [Vol.69,p.413]

Socket wrenches up to 1¼-in. hexagon are furnished with this kit. A 15-in. combination T brace, and speeder are included. No partitions are placed in the



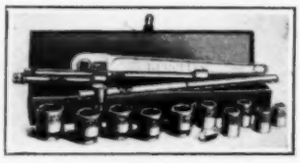
lower part of the box. The sockets are arranged on the upper shelf. The set is packed in a carrying case made of 20-gage sheet steel finished in black lacquer.

— 232 —

Wrench Set, Socket, "Hercules"

Bonney Forge & Tool Works, Allentown, Pa. [Vol.69,p.414]

This set of heavy-duty socket wrenches, made of "CV" chrome-vanadium steel, consists of ten sockets ranging in size



from $\frac{15}{16}$- to 1$\frac{5}{8}$-in. openings. A ratchet handle and long and short extension sliding T-handles are included. Each set is packed in a black-enameled, sheet-steel, carrying case.

— 233 —

Hacksaw Blades, High-Speed

L. S. Starrett Co., Athol, Mass. [Vol.69,p.377]

Although costing more than tungsten-alloy blades, these high-speed hacksaw blades are claimed to reduce the cost of cutting. The No. 840 blades,

intended for hand use, come in 10- and 12-in. lengths. The No. 850 blades are suitable for power saws, and are available in 12-, 14-, and 17-in. lengths.

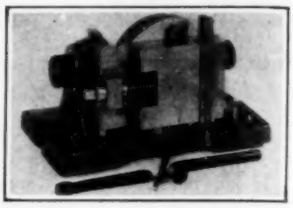
— 234 —

Vise Plate, Universal Angle, "Connecticut"

N. W. Ordway, 69 Congress St., Hartford, Conn. [Vol.69, p.448]

Either a slotted table or a vise can be fastened to this vise plate. Both the table and vise are graduated to 360 deg., and the movement of the vise plate can be measured through 180 deg. Pieces difficult to machine can be attached to the table and milled or ground to any desired angle.

The vise and table are interchangeable. The same two hexagon nuts are used to hold both. Two sizes of this device are available. The first has a base of 4½x7½ in., and carries a table 3¼ in. in diam., having a height of 4½ in. The T-slots are ¼ in. in width. The second size has a base 6½ in. x 9 in. and carries a 4½-in. table having a



height of 5$\frac{13}{16}$ in., and $\frac{5}{16}$-in. T-slots.

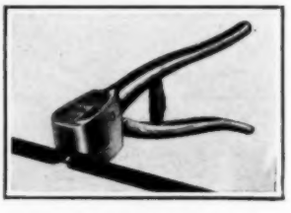
The vise, which can be applied to either size, opens 1$\frac{3}{4}$ in., and has a depth of $\frac{3}{4}$ in. and a width of 3 in. The weights are 16 and 28 lb., respectively.

— 235 —

Cutter, Box-Strapping, Round-End, "Eversafe"

Stanley Works, New Britain, Conn. [Vol.69,p.713]

Box strapping can be cut so that both ends are round by means of the "Eversafe" cutter,



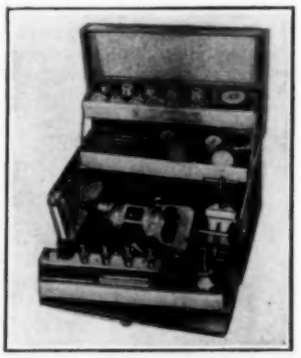
which is made in six sizes to cut strapping in the following widths: $\frac{3}{4}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in. The use of this device prevents box strapping from cutting the workman's hand.

— 236 —

Engine Kit, "Deluxe"

Black & Decker Manufacturing Co., Towson, Md. [Vol.69, p.940]

This kit consists of a metal chest containing a ¼-in., heavy-duty, ball-bearing electric drill, and is complete with valve and



carbon tools to fit nearly every car. The equipment includes tools to ream valve seats as well as valve-seating stones to finish-grind the same parts. Two sizes of valve testers of the compressed-air type are included.

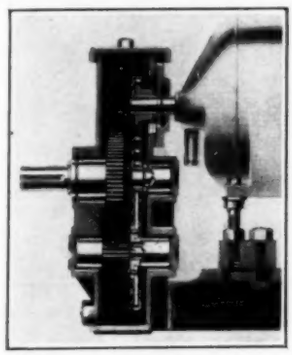
Transmission Equipment

— 237 —

Speed Reducers, Single- and Double-Reduction

Cullman Wheel Co., 1344-54 Altgeld St., Chicago, Ill. [Vol. 69,p.600]

Both single- and double-reduction speed reducers are available in sizes from ¾ to 5 hp. Each motor base is provided with four adjustable studs so that the motor may be lined up accurately.



No coupling is used between the reducer and the motor.

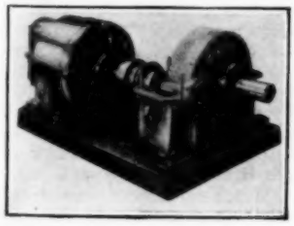
The first reduction in both types is accomplished by a standard Diamond roller chain and sprockets. The speed can be reduced from two to six times in this step. All bearings are of phosphor-bronze, while the gears, shafts and sprockets are of hardened steel. The roller chain furnishes a spray of lubricant to the gearing and bearings. The double-reduction unit has passages drilled in the large shafts for conveying lubricant to the bearings.

— 238 —

Speed Reducers, Roller-Bearing, Farrel-Sykes

Farrel-Birmingham Co., 344 Vulcan St., Buffalo, N. Y. [Vol.69,p.712]

Roller bearings are used on these speed reducers, which have Sykes generated, continuous-tooth, herringbone teeth, and are built in capacities from 1 to 5,000 hp. Both the pinion and gear shafts are held from



end float. According to the manufacturer, a single-reduction unit has an efficiency between 98.5 to 99 per cent, while that for a double-reduction unit lies between 98 and 98.5 per cent.

The single-reduction unit, mounted on the same baseplate with the motor, is available in ratios between 2 to 1 and 10 to 1, in ratings from 3 to 300 hp. The double-reduction unit has an outboard mounting and a generated straight-tooth gear for the final reduction. This type is suitable for installation requiring ratios between 10 to 1 and 60 to 1, in ratings from 5 to 200 horsepower.

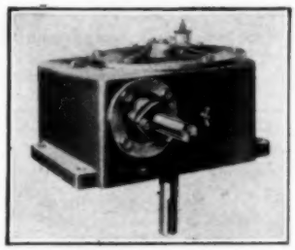
— 239 —

Speed, Reducers, Worm Gear, Heavy-Duty, Vertical-Type

D. O. James Manufacturing Co., 1120 W. Monroe St., Chicago, Ill. [Vol.69,p.785]

Worm gear speed reducers in nine sizes of the vertical type have been placed on the market. The smallest and highest ratios of the smallest size are 5.25 and 40.0 to 1, respectively. The limiting ratios for the largest speed reducer are 9.25 and 48 to 1.

The housing is of gray iron, and is provided with a large



oil-cooling chamber. It is made to permit the drive shaft to project at either the top or the bottom. Timken bearings support both ends of the gear shaft and the worm shaft is mounted on double Timken bearings on one end and Norma-Hoffman roller bearings on the other. Worms are made integral with the wormshafts. The gears are of phosphor-bronze.

— 240 —

Drive, Silent-Chain Standard

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill. [Vol. 69,p.827]

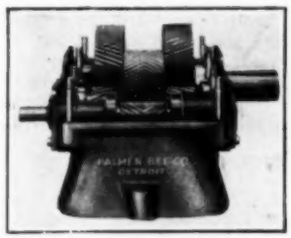
The range of sizes of standard silent-chain drives stocked by the above company has been increased so that drives from ½ to 60 hp. are now available for immediate delivery, whereas heretofore stocks sizes varied only from ½ to 15 hp. Practically any reduction from 1 to 1 up to 7 to 1 for drives up to 60 hp. capacity may be chosen direct from the catalog.

— 241 —

Speed Reducers, Herringbone

Palmer-Bee Co., Detroit, Mich. [Vol.69,p.858]

Single, double and triple series have been placed on the market. The single series have one pair of continuous-tooth herringbone gears, while in the



double and triple series the high-speed gears are of the continuous-tooth, herringbone, Sykes-generated type. The slow-speed herringbone gears are divided in the center, thus permitting a more symmetrical arrangement.

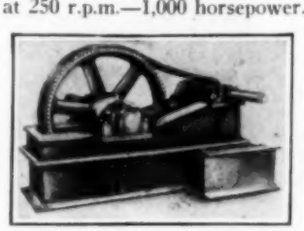
In the single series, Timken tapered roller bearings are used exclusively, whereas in the double and triple series ball bearings are used on the high-speed shaft, Hyatt roller bearings on the intermediate shaft, and Timken roller bearings on the low-speed shaft. Lubricant returns automatically to the reservoir. The efficiency of the single series is approximately 99 per cent, and that of the double series is about 97 per cent, according to the manufacturer.

— 242 —

Speed Reducer, Silent-Chain

Morse Chain Co., Ithaca, N. Y. [Vol.69,p.900]

Both single- and double-reduction units are built; the double-reduction unit consisting of either two chain drives in series, or a single chain drive with a spur gear drive. The range of maximum horsepowers that can be transmitted at various speeds, when designed for favorable conditions, is as follows: At 3,400 r.p.m.—5 hp.; at 250 r.p.m.—1,000 horsepower.



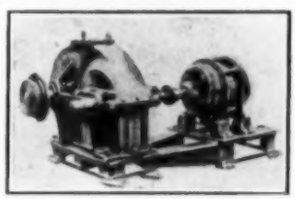
The drive consists of a steel driving sprocket, a cast-iron driven sprocket, and a silent chain. The sprockets are mounted on machined steel shafts, which run in either roller bearings or plain bearings at the option of the purchaser. These bearings may be mounted either in pillow blocks or in thimbles. One end of each shaft projects through the housing, and is arranged to take one-half of a flexible coupling. Lubrication is by means of a bath of oil in the smaller sizes, whereas the larger units make use of a ring oiler. Speed reductions up to ratios of 10 to 1 can be supplied, though for ratios more than 7 to 1 a double-reduction unit is usually recommended. Efficiency of 98.6 per cent has been obtained.

— 243 —

Speed Reducers, Herringbone, Improved

Falk Corporation, Milwaukee, Wis. [Vol.69,p.981]

Certain refinements have been made and sizes added to the line of speed reducers manufactured by the above corporation. These reducers were originally described in Vol. 66, p. 512, of the *American Machinist*. The sizes



that have been added include four single-reduction, three double-reduction, and three triple-reduction units, also nine sizes of vertical single-reduction units.

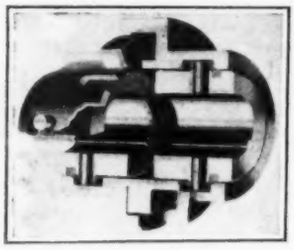
Speed ratios for the single-reduction units of both vertical and horizontal-center types up to 10 to 1, double-reduction units from 10 to 1 up to 70 to 1, and triple-reduction units from 70 to 1 to 300 to 1 are available. A complete line of welded steel motor beds have been added. Alloy steel shafts are now used as well as chrome-vanadium, heat-treated, forged pinions and special steel gears.

— 244 —

Coupling, Flexible, Full-Floating "Flex-Ring"

T. L. Smith Co., Milwaukee, Wis. [Vol.69,p.516]

Torsional load is transmitted through one or more ring-shaped springs made of alloy steel. These springs are not



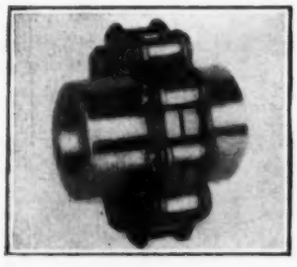
subjected to wear from endwise motion of the shafts, nor from angular or offset misalignment. A shock absorbing member is incorporated, which is claimed to compensate for angular misalignment of the shafts, offsets between shafts, end-play, and shock.

— 245 —

Coupling, Flexible, "Clark"

Diamond Chain and Manufacturing Co., Indianapolis, Ind. [Vol.69,p.783]

The "Clark" flexible coupling, formerly made by the I. H. Dexter Co., Goshen, N. Y., has been acquired by the above company. The standard type is generally used for constant-



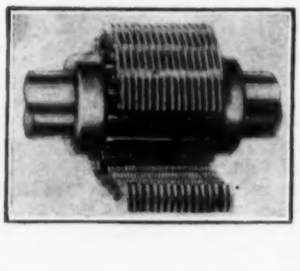
torque drives. It may be obtained with either cast-iron or steel sprockets, and is available in bores from $\frac{3}{8}$ to $8\frac{3}{4}$ in. in steel and $1\frac{1}{4}$ to $7\frac{1}{2}$ in. in cast iron. The sprockets are held together by means of a flexible chain. The type "E" coupling is designed for heavier strains than the standard type. The sprockets are of steel and the hubs are of cast iron. A large sprocket type is available for pulsating drives.

— 246 —

Coupling, Flexible

Morse Chain Co., Ithaca, N. Y. [Vol.69,p.787]

Two sprockets and a piece of chain are the essential elements of this flexible coupling. Each



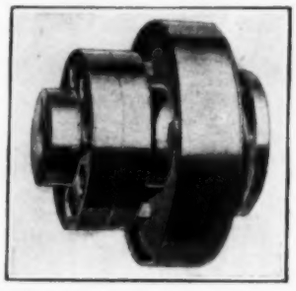
half of the chain is taken by a sprocket, one of which has a guide groove in the center of the face to hold the chain in place. The other, having no groove, is free to float under the chain. The chain fits loosely enough on the sprocket to take care of ordinary misalignment.

— 247 —

Coupling, Flexible, and Automatic Backstop

D. O. James Manufacturing Co., 1120 W. Monroe St., Chicago, Ill. [Vol.69,p.856]

Both the functions of automatic backstop to prevent reversal of travel and that of a flexible coupling are combined in this device, which is applied on the drive shaft between the



speed reducer and the motor. A flange to be attached to the speed reducer housing is cast integral with the ratchet, which operates within a drum housing. The housing, in turn, is connected to the motor shaft through a flexible rubber-bumper-type coupling. On the inner face of the housing, three pawls are secured by studs to engage the ratchet the moment the housing stops revolving. Centrifugal force keeps the pawls out of engagement during operation.

— 248 —

Coupling, Flexible, Full-Floating, Style B, "Flex-Ring"

T. L. Smith Co., Milwaukee, Wis. [Vol.69,p.941]

Flexibility is obtained by means of two long ring-shaped springs made of heat-treated steel. The Style B coupling is

said to compensate for both angular and offset misalignment. All-metal parts are used throughout. The cast-steel hub has two projections machined to fit the gaps in the driving springs, and it is provided with a recess for a felt packing. The semi-steel housing is machined all over. The flange is of semi-steel, and is also machined all over.

— 249 —

Bearings, "Gramix"

U. S. Graphite Co., Saginaw, Mich. [Vol.69,p.1019]

Self-lubricating bearings containing finely-powdered graphite, together with copper and other metals are molded by the above company to the desired size and shape. After the molding process, the bearing is baked, the temperature being carefully maintained. It is then machined to specifications, but a minimum tolerance of 0.001 in., is recommended. These bearings, which are intended for isolated points, contain the graphite as an integral part of the bearing metal itself.

— 250 —

Brake, Mechanically-Operated, Type WB

Electric Controller & Manufacturing Co., 2700 East 79th St., Cleveland, Ohio. [Vol.69, p.785]

This shoe-type brake is intended for the bridge drives of electric traveling cranes; also for lift bridges and electric

hoists. It is designed for lever operation, and is a modification of the type WB electrically-operated brake. Practically all the wearing parts are interchangeable on the two types. This mechanically-operated brake is heavily designed, and thick molded asbestos brake shoes are featured.

— 251 —

Hangers, "*hp* Microhite"

Boston Gear Works Sales Co., Norfolk Downs (Quincy), Mass. [Vol.69,p.856]

Self-alignment of the bearings is permitted by freedom to move both in the horizontal and vertical planes. The hanger has been developed by the Hardware Products Co., 103 Rich-

mond St., Boston, Mass., but will be marketed exclusively by the above company. Stock sizes range from bores of $\frac{1}{2}$ to 1 in., and heights to the center line from $3\frac{1}{2}$ to $10\frac{1}{2}$ in. The range of bearing lengths is 2 to $2\frac{1}{2}$ in. Both ball or bronze bearings, which are interchangeable, may be obtained.

— 252 —

Pulleys, Semi-Steel, "True Blue"

W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Rd., Chicago, Ill. [Vol. 69,p.598]

These machine-molded pulleys of semi-steel are obtainable in solid, split, split-arm, and double-arm types. They are available in stock sizes from 2 to 60 in. in diam., although not all sizes of each type are stocked. Pulleys up to 12 ft. in diam. can be made. None of these pulleys are intended to be run at more than 5,000 ft. per min., whether balanced or not.

Welding Equipment

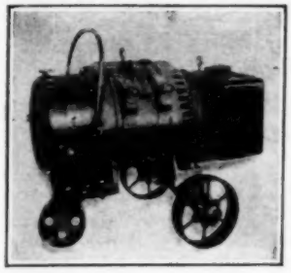
— 253 —

Welders, Arc, Series R, "Fuzon"

Fusion Welding Corporation, 103rd St. and Torrence Ave., Chicago, Ill. [Vol.69,p.297]

Several features common to previous designs have been retained. Among these are: The use of an interpole arrangement of the commutating coils to form a stabilizer; an auxiliary set of brushes giving a single control of the current, and ball bearings on the generator shaft. These machines are made in portable and stationery models of both the motor-generator and gas-engine-driven types.

Motor-generator units are made in capacities of 200, 300,



and 400 amp. The starter used on all machines is of the push-button type with automatic overload kick-out switch. The dimensions are 41x21 in. and 70x25 in. for the smallest and largest sizes respectively. The weights of the portable sets are 1,080, 1,375, and 1,600 pounds.

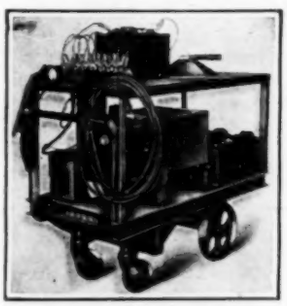
The gas-engine-driven units are built in capacities of 200 and 300 amp. The smaller size is driven by a motor having 25 brake hp., and the larger by a motor having 40 brake hp. An automatic governor keeps the engine speed constant. The length, width, and height of the two models are 68x30x60 in., and 72x30x63 in., for the portable type. Weights for the portable type are 1,550, and 1,910 pounds.

— 254 —

Welder, Arc, Battery, Model BW-1

Pennsylvania Engineering Laboratories Co., 5222 Penn Ave., Pittsburgh, Pa. [Vol.69, p.336]

No power circuit is required by this welder, which consists of a portable arc-controller, charger and batteries, all mounted on the lower deck of a durable truck. An upper deck



is provided for recharging automobile storage batteries. In cases where it is impossible to use the truck shown, the units may be disconnected and carried to the job.

The current range of six different steps is controlled by a switch on the battery arc-controller. The current limit is about 250 amp., and welding wire from $\frac{1}{32}$ to $\frac{5}{32}$ in. can be used.

The standard outfit has sufficient capacity to weld one 12-in. I-beam, including reinforcing, on one charge. It comes complete with leads, electrode holder, wire brush, handshield, and sample welding wire.

Weight 1,500 pounds.

— 255 —

Welder, Trailer-Type, Series R, "Fuzon"

Fusion Welding Corporation, 103rd St. and Torrence Ave., Chicago, Ill. [Vol.69,p.522]

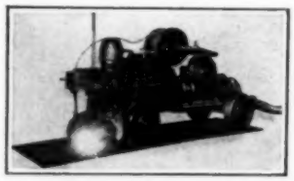
Pneumatic rubber-tired wheels have been applied to the portable gas-engine-driven welder manufactured by the above company. It is available in two sizes—200 and 300 amp., the first driven by a 23-hp. motor, and the second by a 40-hp. motor. The welder is not self-propelling, but must be attached to a truck or tractor for transportation to different points.

— 256 —

Welder, "Electronic Tornado," Tractor-Type

Lincoln Electric Co., Cleveland, Ohio. [Vol.69,p.562]

This automatic arc welder is used for making lap and butt welds on large tank bottoms. The machine consists of an "Electronic Tornado" head



mounted on a self-propelled four-wheel drive carriage. Power is supplied through a flexible cable.

In making lap welds with this machine, no filler metal is used. The heat of the carbon arc fuses the edge of the top plate into the lower plate. A filler strip is laid over the seam to be welded when a butt weld is desired.

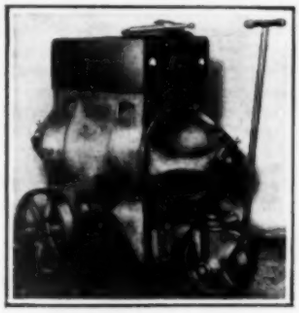
Speeds on $\frac{1}{4}$-in. lap joints varying from 50 to 75 ft. per hour have been obtained.

— 257 —

Welders, Arc, Motor- and Gas-Engine-Driven, 200-Ampere

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.69,p.670]

The illustration shows the type "D.C.-D.C." welder, which may be driven by either a 230- or 550-volt d.c. motor. The gas-engine-driven machine is powered by a Model P-220 four-cylinder Continental engine. The welding range of the gen-



erator is from 60 to 300 amp. It is a single-operator, constant-current, differentially-wound type, and is separately excited.

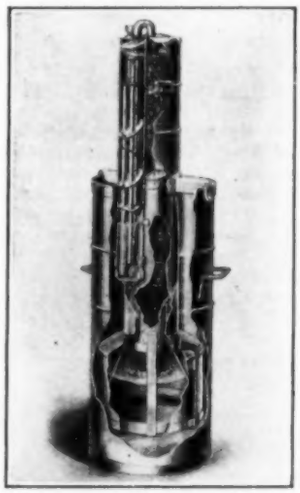
The engine and generator of the gas-engine-driven type are complete with all controls. The unit is mounted on an arc-welded channel-iron base suitable for either stationary or portable use. The engine is rated at 24 brake horsepower.

— 258 —

Acetylene Generator, Low-Pressure, "Carbic"

Oxweld Acetylene Co., 30 East 42nd St., New York, N. Y. [Vol.69,p.255]

The three sizes of this generator are known as types B, K, and X, which will generate 45, 80, and 30 cu.ft. of acetylene per hour, respectively, at a



pressure of less than 1 lb. per sq.in. It is claimed that the type B has ample capacity for all cutting operations, and any but the heaviest welding and heating jobs. Type K will handle any job possible with one torch, and type X will weld metal up to $\frac{1}{2}$ in. in thickness, and will cut iron and steel up to 2 in. in thickness.

The "Carbic" generator consists of three parts—the water tank, gas bell, and cake holder. All seams and joints are welded, and the assembly is galvanized. Charging consumes about 3 minutes.

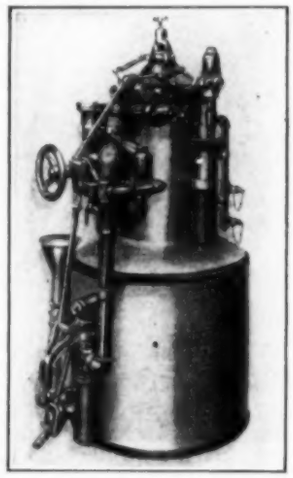
Heights and diameters of types B, K, and X, are 52x14 in., 58x26½ in., and 39x14 in., respectively. Weights, fully charged, 210, 694, and 124 pounds.

— 259 —

Acetylene Generators, Medium-Pressure

Oxweld Acetylene Co., 30 East 42nd St., New York, N. Y. [Vol.69,p.554]

The type MP-2 is built in two sizes having 50- and 100-lb. carbide capacity. The MP-3 has a capacity for 300 lb. of carbide. The feed mechanism of the type MP-2 has been redesigned and the type R-40 reg-



ulator is furnished. The hydraulic back-pressure valve, which has been simplified, and the filter are made of seamless steel tubing. Two relief valves are provided. Approximately 11 lb. per in. is the maximum pressure delivery. The type MP-2 uses $\frac{1}{4}$x$\frac{1}{2}$-in. carbide. Shipping weight for the 100-lb. size 1,100 lb., for the 50-lb. size, 925 lb. Diameters 3 ft. 5 in., and 3 ft. 1 in., respectively.

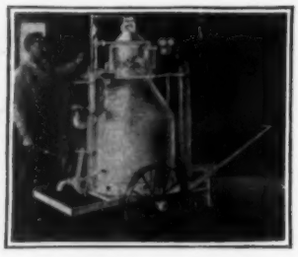
The type MP-3 has the feed driven by a motor actuated by a weight. The hydraulic back-pressure valve is so arranged that it is always filled with water before the generator itself is filled entirely. The feed motor is rendered inoperative if zero pressure exists. This generator uses 1¼x3 in. carbide. Overall height, 120 in.; diam. 42½ in.; shipping weight, 2,300 lb., net.

— 260 —

Acetylene Generator, Gas-Vibrator, "Rego"

Bastian-Blessing Co., 240 E. Ontario St., Chicago, Ill. [Vol. 69,p.980]

All three types are available in 30-, 60-, and 100-lb. sizes. The types A and N are for stationary use, and are suitable



for operating a few torches only. The type P generator is automatic in its action, and is intended for portable use.

After starting the feed valve manually, the bubbling gas moves the bell up and down, this movement being transmitted through connecting rods to the feed valve, thus causing it to shake more carbide into the water. This action causes gas to be generated automatically in the required amount. The pressure regulator shown at the right serves as an auxiliary governor of the movement of the feed valve, which may be set at any desired operating pressure from 1 to 14½ lb. per sq.in. The regulator is suitable for gas pressures up to 2,000 lb. per sq.inch.

— 261 —

Burner, Preheating, Kerosene, Wheelbarrow-Mount

Chausse Oil Burner Co., Elkhart, Ind. [Vol.69,p.219]

This portable kerosene burner is suitable for preheating prior to welding. The wheelbarrow type of mounting permits the burner to be transported easily.

A welded steel tank with a capacity of 14 gal. of kerosene has attached to it a kerosene burner by means of heavy-duty, flexible hose. The tank has a self-contained air pump and pressure gage. The burner handle has a wooden grip and convenient needle valve. A flame temperature from 1,750 to 1,800 deg. F. is produced.

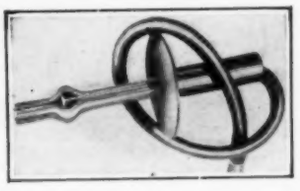
— 262 —

Electrode Holder, Model A

Fusion Welding Corporation, 103rd St. & Torrence Ave., Chicago, Ill. [Vol.69,p.517]

Four clean points of contact are assured by the scraping action that occurs when the rod is inserted in this holder. The jaws are made of a special copper alloy, which resists arcing. Spattered drops of electrode metal will not stick to them.

The electrode may be placed at any desired angle. The



holder is light in weight, and is available either with or without 3 ft. of flexible cable sweated in.

— 263 —

Goggles, Helmet, Cap- and Skeleton-Types

Oxweld Acetylene Co., 30 East 42nd St., New York, N. Y. [Vol.69,p.940]

The No. 9 cap-type goggle consists of a strong fiber cap to which a pair of goggles is attached by means of fiber links. The goggles can be arranged over the forehead or lowered

over the eyes with one hand. The bridge is adjustable, and is covered with rubber insulation. Replaceable lenses in the same size and colors as supplied with the Oxweld No. 6 goggles are used, the colored lenses being protected by cover lenses of clear glass. The No. 10 skeleton-type goggles are the same as the No. 9 except that the goggles are attached to a leather skeleton cap.

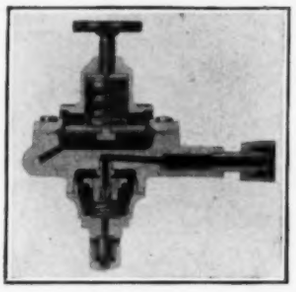
— 264 —

Regulator, Oxygen, with Safety Release Valve

Torchweld Equipment Co., 224 N. Carpenter St., Chicago, Ill. [Vol.69,p.828]

The safety valve is fitted to the back cap of the regulator, and is automatic in operation. It can be put on all Torchweld regulators now in use. The safety feature is simple, consisting only of a spring plunger seating on a machined surface in the back cap, a plunger, and the valve cap.

The regulator body is provided with a three-ply diaphragm of the self-centering type. The diaphragm has a simple means of maintaining uniform tension. Sturdy brass forgings are used throughout.



— 265 —

Rod, Welding, High-Speed, "Fleet-Weld"

Lincoln Electric Co., Cleveland, Ohio. [Vol.69,p.827]

An extruded welding rod, which permits high-speed welding while retaining the ductility of the weld, has been developed. According to the manufacturer, the speed of welding has been doubled or trebled without obtaining porosity of the welded metal. Deep penetration is another feature of the rods.

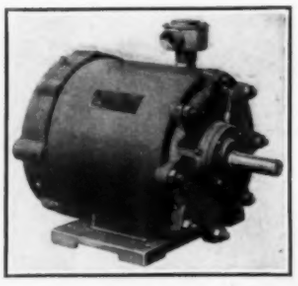
Electrical Equipment

— 266 —

Motor, Self-Ventilated, Explosion-Proof, Type EX

Louis Allis Co., Milwaukee, Wis. [Vol.69,p.221]

Light weight and minimum space requirements are the features of this motor, which is available in sizes up to 5 hp. A 5-hp. motor weighs but 33 lb.



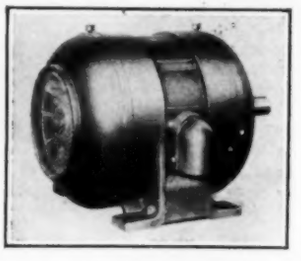
more than an open-type motor of the same rating. This type has received the approval of the Underwriters' Laboratories, and is suitable for applications where explosive mixtures of the fumes of gasoline, naphtha, acetone and alcohol are present.

— 267 —

Motor, Fan-Cooled, Totally-Inclosed, Type ARZ

Allis-Chalmers Manufacturing Co., Milwaukee, Wis. [Vol. 69,p.334]

This line of inclosed motors is built in sizes from 1 to 50 hp. The exterior shell is composed of two castings and a steel-plate central section. A fan is mounted on the shaft, and sucks air through the wire-mesh screen, and blows it over the iron casing surrounding the motor windings. This fan is



suitable for rotation in either direction.

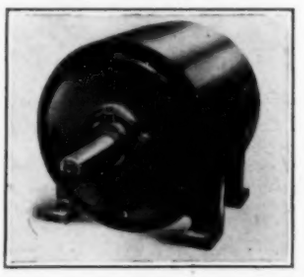
By means of tubes, lubricant is carried from outside grease cups into the bearings, which are dustproof. The internal parts of the motor are easily accessible. Each motor is built on the same frame as for the standard, open-type machine of the same rating.

— 268 —

Motor, Fan-Cooled, Totally-Inclosed

Cleveland Electric Motor Co., Cleveland, Ohio. [Vol.69,p.337]

A double shell through which air is sucked by means of fans surrounds this motor. The inner shell contains the entire mo-



tor. The air is blown over the surface of this inner shell and out at the pulley and through an annular space.

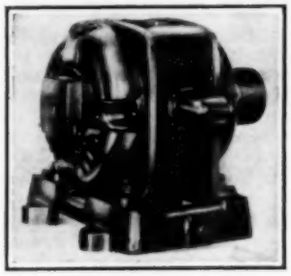
Special packing of the bearings makes them dustproof. It is claimed that this motor permits practically the same rating for a given frame size as an open-type motor.

— 269 —

Motor, Repulsion-Induction, Single-Phase, Improved

General Electric Co., Schenectady, N. Y. [Vol.69,p.520]

This motor is made in four sizes, namely, ¾, 1, 1½ and 2 hp. It operates at 1,800 r.p.m. It supplements the present line of "SCR" motors, and is of the



constant-speed, high-starting-torque type. A sinusoidal arrangement of the stator coils is used.

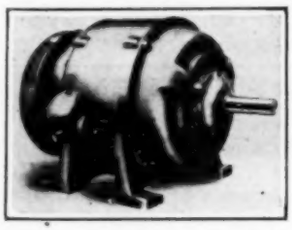
The commutator and brush rigging have been modified so that the commutator end shield has the same dimensions as the pulley end shield. Phosphor-bronze, waste-packed bearings are used at both ends. The motor is inclosed except for ventilating openings in the lower portion of each end shield. Air is circulated by means of an internal fan. The motor may be made in the totally-inclosed type.

— 270 —

Motor, Induction, Skeleton-Frame

Reliance Electric & Engineering Co., Ivanhoe Road, Cleveland, Ohio. [Vol.69,p.634]

Air is drawn through the skeleton frame by an exhaust fan mounted on the end of the rotor shaft away from the pulley. It is exhausted at the



front end. Protection of the motor windings is assured by the use of sheet-metal radiating bonnets. The ball bearings are also protected. Dirt from the cooling air falls to the bottom of the bearing bracket outside the inclosing bonnet, where it may be blown out.

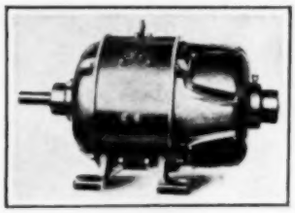
Available sizes range from 1½ to 40 hp. for operation on 220-, 440-, and 550-volt, 2- or 3-phase, 60-cycle circuits.

— 271 —

Motor, Watertight

Roth Brothers & Co., 1,400 W. Adams St., Chicago, Ill. [Vol.69,p.1015]

This motor was designed for hoist duty, is compound-wound for operation on d.c. circuits, and is reversible. The bracket on the end opposite the pulley



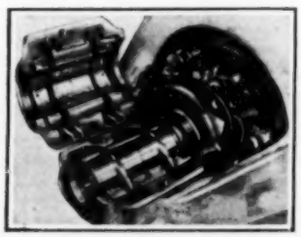
has four handhole covers, rubber sealed, the removal of which permits easy access to the commutator brushes and rigging. The machine is fitted with ball bearings, and requires greasing not more than once a month.

— 272 —

Motors, Bearing Construction for, Ball and Sleeve

Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo. [Vol.69,p.481]

All horizontal motors made by the above company, with the exception of the air-jacketed and high-speed types, are available with an improved sleeve bearing construction. Sleeve bearings of the double-ring type are placed in one-piece oil wells. The oil grooves run both later-



ally and circumferentially. End grooves gather excess lubricant and return it to the well through drain holes. The babbitt lining is dove-tailed into the cast-iron bearing shell. An oil slinger prevents oil from passing into the motor.

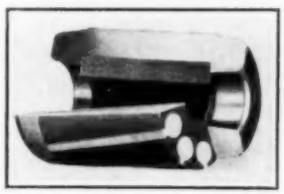
In the ball bearing motors, a cartridge-type mounting is used, so the rotor can be removed without exposing the bearings. The outer races are fitted so as to "creep" slowly, while a slight "shrink" fit is used for the inner races. Gaskets prevent leakage between the caps and the motor frame, and a series of grooves keep lubricant from creeping out of the housing and along the shaft. Felt washers held by metal washers provide an additional safeguard.

— 273 —

Rotor, "Hicycle," Jointless, "Uniloy"

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. [Vol.69,p.35]

No joints and a one-piece conductor element are the principal feature of this squirrel-cage, portable electric tool rotor. It is interchangeable with the older type used on the "Hi-



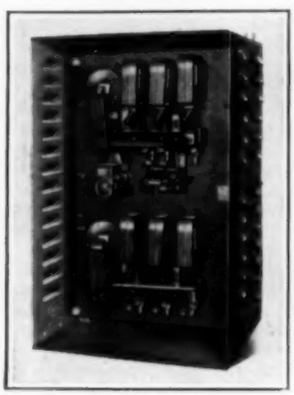
cycle" made by the above company. The "Uniloy" conductor has a coefficient of expansion practically the same as the core so that there is no danger of undue mechanical strains being set up. The alloy used provides additional advantages such as less weight and more power. The shaft is removable.

— 274 —

Relays, Motor, Thermal Overload

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.69,p.71]

This device retains calibration and automatically permits the safe overload capacity of the motor to be fully utilized. It follows the heating curve of the motor, which means that the motor will not shut down instantly in case of high, but



harmless, overcurrent demands. It delays its action inversely as the current flowing. The higher the overload the shorter the time in which it will operate. The relay is easily adjusted for plus or minus 20 per cent of normal rating by means of a small lever.

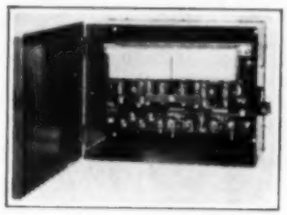
The thermal overload relay is of small size and completely inclosed. The casing is louvred.

— 275 —

Starter, A. C., Automatic, Reversing

Industrial Controller Co., Milwaukee, Wis. [Vol.69,p. 221]

Remote control, low-voltage and overload protection are provided by this a.c. starter. The device is made for all usual voltages and for either two- or three-wire control. It is rated at 15 amp. The Class 8732 starter has two mechanically interlocking contactors, and is



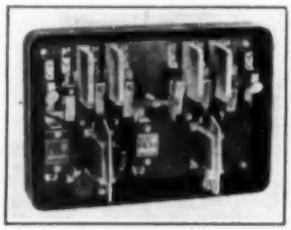
provided with thermal-overload relays. Class 8712 is of similar construction, and is furnished without overload relays. The mechanism of either type is entirely inclosed.

— 276 —

Switch, Reversing, Across-the-Line

General Electric Co., Schenectady, N. Y. [Vol.69,p.257]

This switch bears the designation of CR-7009-B 12, and is suitable for reversing small a.c. motors. The device consists of two triple-pole, barrier-type,



magnetically-operated contactors, mechanically and electrically interlocked, and two hand-reset temperature-overload relays mounted on a molded base. The relays have interchangeable heaters. The device is inclosed in a drawn-shell case.

— 277 —

Starters, Automatic, A.C., Classes 8526 and 8536

Industrial Controller Co., Milwaukee, Wis. [Vol.69,p. 413]

The three types of these starters are push-button in cover, no push-button, and three-point switch in cover. The cases are finished in baked enamel.

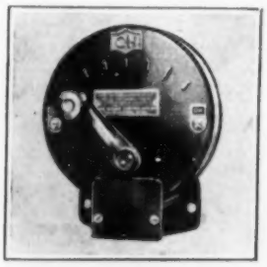
The starters supersede the classes 8527 and 8537 formerly manufactured by the above company. Besides providing low-voltage and either magnetic or thermal overload protection, the interlock provided permits replacement of contacts. Magnetic blowouts are used to reduce arcing. An extra-heavy magnet coil provides heavy sealing pressure, and the floating armature tends to eliminate magnetic hum. Self-aligning bearings and bronze bushings to reduce wear are included.

— 278 —

Rheostats, Regulating, D.C.

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol.69,p.483]

Small size is the chief feature of this rheostat, which is used to control the speed of fractional-horsepower motors driving small blowers, fans, and buffers. It can be used also as a dimmer on



lighting circuits, or as an electric heater regulator.

The device is completely inclosed. The essential element consists of a resistance unit imbedded in cement and having brass contact buttons protruding. The contact arm is operated by an outside lever.

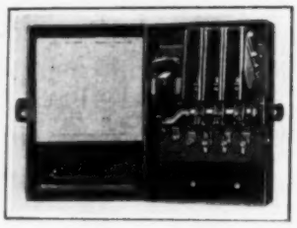
— 279 —

Contactors, Magnetic, A.C.

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol.69,p.488]

Two,- three-, and four-pole types of this contactor in capacities ranging from 20 to 150 amp. are available. Two- or three-wire control can be used. With two-wire control, low-voltage release is provided, and with three-wire control, low-voltage protection is incorporated.

Among the features are: Hammer-head-type magnets with self-aligning armature, continuous-duty magnet coils, hardened steel bushings, tin-dipped solid copper contacts,



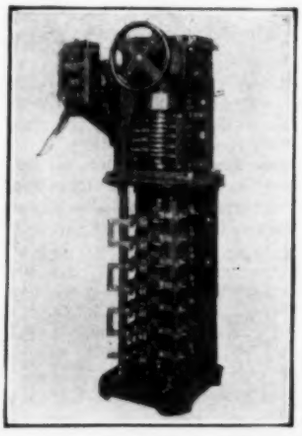
magnetic blowouts, and chimney-type arc shields. The contactors have the magnetic frame supported on a spring plate, which absorbs the shock of the magnet on closing. They are supplied for panel mounting.

— 280 —

Controllers, Cam, Motor-Operated

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.69,p.708]

These cam controllers designed for the secondary control of wound-rotor induction motors, carrying 250, 500, or 800 rotor amperes at 1,000 secondary volts, are made with either 13 or 23 contact points, and can be operated by a push-button



station. It is designed for either floor or frame mounting. The main unit consists of a group of cam-operated contactors arranged for sequence operation. The shaft is extended at the bottom to mount a position-indicator motor.

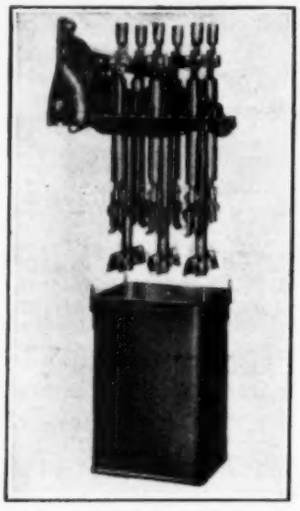
The top unit consists of a pilot motor with brake, notching drum, handwheel, clutch, and eight auxiliary cam-operated contactor units. Either a compound-wound d.c. pilot motor or an a.c. 3-phase pilot motor is furnished. The auxiliary top unit with push-button control consists of an indicating plate only. If automatic control by a compensating type of pressure regulator is desired, this unit is replaced by a suitable indicating plate and unit.

— 281 —

Circuit Breakers, Oil, Type FK-33

General Electric Co., Schenectady, N. Y. [Vol.69,p.982]

Compactness and easy operation are features of this device, which is built in several sizes rated at 4,500 volts, 200- and



400-amp. capacities, in 2-, 3-, and 4-pole single- and double-throw types, having interrupting capacities of approximately 20,000 kva. at the rated voltage.

— 282 —

Switch, Push-Button, Type 70-50

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol.69,p.1019]

This feed-through switch is for use with small tools. The internal mechanism has been improved and the wiring space is quite large. The cover screws

are anchored to prevent loss. The entire case is of Bakelite and a black and red button designates when the current is "off" and "on."

— 283 —

Fan, Electric, "Man Cooler"

Peerless Electric Co., Warren, Ohio. [Vol.69,p.296]

This unit is recommended for directing a blast of air on men working in hot and dusty situations. It consists of an electric fan mounted upon a swiveling

standard, in turn supported by a cast-iron pedestal.

Then fan is 18 in. in diam., and has fifteen steel blades imparting a velocity of 1,400 ft. per min. to the air. It is driven by a ¼-hp. single-phase, 60-cycle, 110- or 220-volt motor. The fan is protected by a heavy-gage mesh screen, and an angle-iron frame protects the motor. The unit is supplied with 20 ft. of special rubber-covered "Flexo-cord."

Height 57 in.; weight 190 pounds.

— 284 —

Fuses, Plug, with Colored Tops

Trico Fuse Manufacturing Co., Milwaukee, Wis. [Vol.69, p.669]

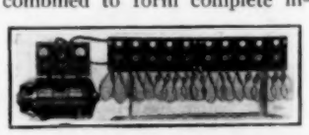
The colored top, a color for every size, enables the user to know the capacity of the fuse. For example, a 6-amp. fuse has a brown top, while a 10-amp. fuse has a yellow top.

— 285 —

Panels, Battery-Charging, Constant-Potential, "Vary Rate"

Hobart Brothers Co., Troy, Ohio. [Vol.69,p.1014]

Due to the small units in which they are furnished, the "Vary Rate" panels may be combined to form complete in-



stallations that are limited only by the capacity of the constant-potential battery charger with which they are used. Two sizes are available, one 2 ft. long and the other 4 ft. long. Each is equipped with instruments and connections for five batteries.

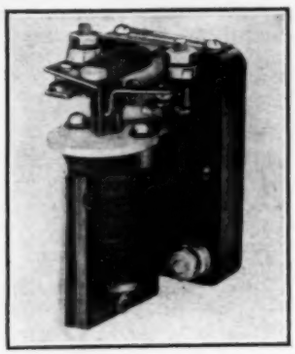
Each unit consists of an ebony asbestos-board panel on which are mounted five separate, plainly marked ammeters and five separate, specially designed rheostats and five sets of battery connectors, which may be removed quickly if desired.

— 286 —

Relay, Signal, Power-Failure

General Electric Co. Schenectady, N. Y. [Vol.69,p.296]

This relay is used to actuate a warning signal when power fails or voltage drops on an important circuit. Either a.c. or d.c. circuits can be taken care of. The device is of the solenoid type, having a laminated armature of three sections, the central leg being fastened to a Bakelite operating arm, which raises and lowers the contact tips. The unit is mounted on a molded compound base, 1¾ in. wide, and 2½ in. high.



A fine adjustment of pick-up and drop-out may be obtained. In tests, the relay was made to drop out at 106 volts, after picking up at 112 volts.

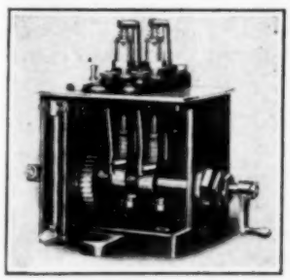
Miscellaneous Equipment, Materials and Supplies

— 287 —

Lubricator, Force-Feed, Model F

American Oil Pump & Tank Co., Cincinnati, Ohio. [Vol.69, p.598]

Oil is pumped only when the machine is in operation. The device is made in various sizes giving from 1 to 16 feeds. A separate pumping unit is provided for each feed. Any unit



may be removed for cleaning or inspection without disturbing any other unit.

The body is made of cast iron and a hexagonal shaft runs lengthwise through the reservoir. The shaft is fitted with a cam for each pump unit. A heating chamber is provided in the reservoir with openings tapped for ¾-in. standard pipe for steam heating.

— 288 —

Lubricating System, "Farval"

Lubrication Devices, Inc., 51 S. Washington Ave., Battle Creek, Mich. [Vol.69,p.714]

The "Farval" mechanical lubricating system was acquired by the above company from the Farmer Lubrication Systems, Inc., 2611 Sixteenth St., Detroit, Mich. The system, which is designed for positive lubrication of machine parts from a central point by means of oil or grease under pressure, was described under its former name on p. 511, Vol. 66, of the *American Machinist*.

— 289 —

Pulsating System for Oil Lubrication, Blanchard

Rivett Lathe & Grinder Corporation, Brighton, Boston, Mass. [Vol.69,p.864]

An automatic circulation system for the oil lubrication of machinery has been announced under the trade name of "Blanchard Pulsating System." It is

designed to operate without attention once it has been properly adjusted. Oil is circulated from a central tank through a single, closed, circulating system in which are inserted as many feeders, singly or in gangs, as may be required.

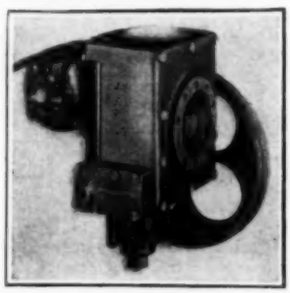
The pump, which is contained within the tank and starts and stops with the machine, keeps the oil circulating steadily at a pressure of about 10 lb. for 95 per cent of the cycle. Once every fifteen revolutions of the pump, the control valve closes for 5 per cent of the cycle and the pressure builds up momentarily to 50 or 60 lb., thus causing the valve in each feeder to lift and send the correct quantity of oil to the bearing. The pump is a simple, double-plunger unit with piston valves, and the speed range is from 75 to 125 r.p.m. The oil flow through each feeder can be regulated by rotating the spring retainer.

— 290 —

Oiling System, "Automatic"

Automatic Oiler Co., 13835 Jennings, at Grand River Ave., and Coolidge Highway, Detroit, Mich. [Vol.69,p.1016]

Oil is supplied in the correct quantity to each bearing connected to an "Automatic" oiling system. Four models, known as the types 5, 10, 20, and 40 are available, each complete with a pulley. If desired, motor drive can be obtained for any unit. The quantity of oil delivered to each bearing is regulated from one drop to a tablespoonful by means of a needle



valve. Time of delivery is regulated by the speed of the driving pulley.

The principle of the system is that oil is delivered through successive feeders in the faceplate by oil passages drilled in two rotating wormwheels. The wheels revolve at different speeds. The oil passages mate opposite each successive feeder in turn, because of their speed ratios. A gear pump supplies the head. The normal operating pressure is about 25 lb. per sq. inch.

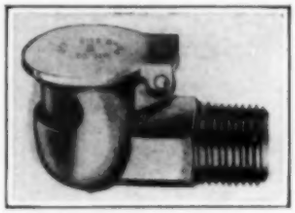
The types 5 and 10 have capacity for about one quart, whereas the types 10 and 20 contain about two quarts of oil. Measurements are: 6x7½x4- and 8x9x4 in., respectively.

— 291 —

Gage, Oil, Angle, Style S G B

Gits Bros. Manufacturing Co., 1940 S. Kilbourn Ave., Chicago, Ill. [Vol.69,p.560]

Functions of both filler plug and level are performed by this oil gage with sight glass. Two sizes are available. The smaller has an overall height of 1¼ in., a body 1 in. in diam., and a ⅜-in.



pipe shank. The larger has an overall height of 1⅝ in., a body diam. of 1¼ in., and a ½-in. pipe shank. The body is of one-piece brass construction, and a self-closing hinge lid is provided. The standard finish is mechanical nickel plate.

— 292 —

Grease Gun and Fittings, High-Pressure

Gits Bros. Manufacturing Co., 1940 South Kilbourn Ave., Chicago, Ill. [Vol.69,p.827]

Pressures up to 3,000 lb. per sq.in. can be exerted on lubricants by this hand compressor. The capacity is 8 oz. of lubricant and when full, the total weight is 2¾ lb. Lubricants ranging from those as light as

kerosene to greases as heavy as No. 5 cup grease can be handled.

Fittings used with the gun are of the low-setting type. In some cases the height from the end of the thread to the top of the face does not exceed ¾ in. All fittings are case-hardened and fit snugly into the machined nozzle of the compressor.

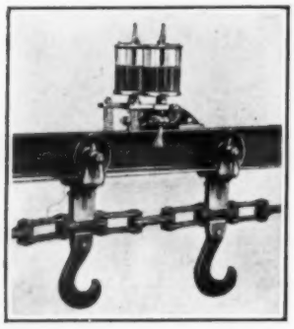
The compressor body is made of seamless steel tubing. The overall length, when filled with grease is 19½ in., and the length from the nozzle to the top of the barrel is 13 in. The fittings are turned from solid bar stock and are furnished in both straight and angle types.

— 293 —

Lubricator, Conveyor, Automatic

Saginaw Stamping and Tool Co., Saginaw, Mich. [Vol.69, p.337]

Effective lubrication of conveyor wheels applied to drying systems, washing machinery, enameling ovens, and core ovens, is provided by the use of this device, which consists of a sight-feed lubricator and a wiper brush that contacts with an oil spout on the conveyor



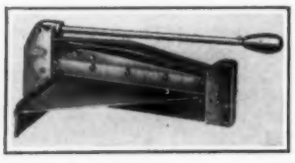
wheel. Oil runs down through the spout and into the well surrounding the bearings.

— 294 —

Belt Cutter, 10-Inch

Clipper Belt Lacer Co., Grand Rapids, Mich. [Vol.69,p.377]

This device is used for cutting from a roll or squaring



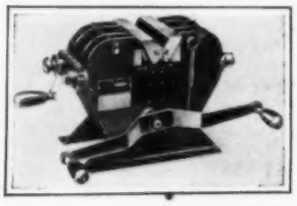
ends of belting up to 10 in. in width. The body is made from cold-rolled steel plate and malleable castings. Tool steel is used for the knife.

— 295 —

Belt Lacer, Speed, No. 6

Clipper Belt Lacer Co., Grand Rapids, Mich. [Vol.69, p.522]

All belts from 1 to 6 in. in width can be laced in 1½ min., according to the manufacturer. A three-quarter turn of the



crank causes the powerful jaws to exert a pressure of 37,500 lb. on the belt. This pressure causes the hooks to be in perfect alignment and absolutely flush with the surface.

Weight 56½ pounds.

— 296 —

Box Strapping, "Eversafe"

Stanley Works, New Britain, Conn. [Vol.69,p.713]

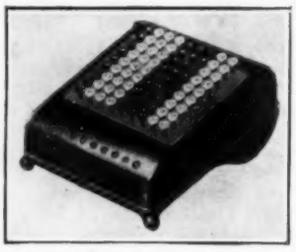
"Eversafe" box strapping, having a hard japan finish, is furnished in all standard sizes in mill coils of continuous lengths. It is packed in barrels of approximately 500 lb. each, and may be "coiled double" when desired. It is furnished in the usual widths.

— 297 —

Calculator, Electric

Borroughs Adding Machine Co., Detroit, Mich. [Vol.69, p.783]

This electrically-operated calculator has a light key touch, which is uniform for all keys. Positive key action is another feature. Errors due to incom-



pleted strokes of the keys are impossible as the operator cannot short-stroke or otherwise misoperate a key. The small motor is entirely inclosed, and operates on a.c. or d.c. A ten-column totaling size is available.

— 298 —

Calculator, Payroll

Meilicke Systems, Inc., 3466 N. Clark St., Chicago, Ill. [Vol.69,p.711]

A means of compiling payrolls, quickly and accurately in shops in which the employes are paid on a piecework or hourly

basis, is supplied by this device, which consists of a rack of numbered cards, each card containing at the top the rate of pay. Each card permits calculations for work periods up to 150 hours.

— 299 —

Casters, "Supreme" and "Jumbo"

Saginaw Stamping & Tool Co., Saginaw, Mich. [Vol.69, p.297]

Both casters, made in swivel and rigid types, are intended for heavy-duty service. The "Su-

preme" caster is made of pressed steel, and can be had with a ball bearing swivel. As illustrated in Fig. 1, the roller bearing is caged in hardened bushings and thrust washers. The Supreme will withstand loads up to 1,500 lb. It is made in 4-, 5-, and 6-in. wheel diameters, all with 2-in. faces.

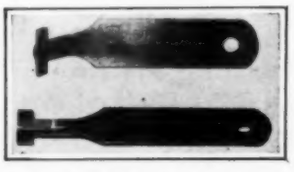
The "Jumbo" caster has plain bearings as illustrated in Fig. 2. It is made in 3-, 4-, 5-, and 6-in. wheel sizes. The 3-in. size has a 1½-in. face, all the rest being 2 in. The 3-in. wheel will withstand loads of 400 lb., while the larger sizes are recommended for loads up to 1,000 pounds.

— 300 —

Cleaner, T-Slot

Detroit Stamping Co., 3401 West Fort St., Detroit, Mich. [Vol.69,p.519]

Cleaning clips and dirt out of T-slots in machine tools is the function of this device. It is made of a flat stamping, reinforced by a rib at the operat-



ing end. At the opposite end is located a punched hole to enable the tool to be hung up.

The cleaner can be used straight or can be bent at an angle if desired. The T-end is designed to clean either ¼-, ⅜-, or ¾-in. slots.

— 301 —

Cleaner, Valve Guide, "Perfection," Scully-Ruggles

Scully Steel & Iron Co., 2364 South Ashland Ave., Chicago, Ill. [Vol.69,p.827]

Carbon can be removed from valve guides by means of this cleaner. The spiral blades at the left take long shearing cuts, and are self-sharpening in their action. The front ends of the

blades are attached to the end of the handle and the collar rides on the handle. This construction permits the use of one size of cleaner for several sizes of valve guides. The handle is made of cold-rolled steel with spring grip. Four sizes are manufactured. The ranges of valve guides that may be handled by the four sizes are 0.296 to 0.338 in., from 0.340 to 0.392 in., from 0.400 to 0.500 in., and from $\frac{9}{16}$ to $\frac{3}{4}$ inch.

— 302 —

Compound, Pickling, Du Pont

Research Manufacturing Co., Oak Lane Station, Philadelphia, Pa. [Vol.69,p.706]

Scale and oxide may be removed from steel without overpickling or pitting the steel by means of Du Pont pickling compound, which contains within itself an inhibitor that suppresses the flow of hydrogen gas. It is made by the E. I. Du Pont de Nemours Company.

— 303 —

Compound, Pulley Facing, Anti-slip, "Pulley Stone"

Chicago Belting Co., 113 North Green St., Chicago, Ill. [Vol.69,p.713]

The efficiency of existing belt drives can be brought up to 98 per cent by applying this compound to the pulley faces, ac-

cording to the manufacturer. When spread on by hand, the surface is smooth enough to give high adhesion, which increases the service. A thin coat is sufficient.

— 304 —

Compound, Slushing, No. 280

General Electric Co., Merchandise Dept., Bridgeport, Conn. [Vol.69,p.376]

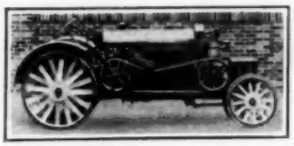
This No. 280 viscous slushing compound is used for slushing gears, shaft journals, and exposed finished metal parts of machinery to prevent rush while in storage or in transit. According to the manufacturer, this compound is cheaper than most greases used for the purpose, and it has the added advantage of partially drying on the metal, thus forming a protective coating, which will not readily rub off in handling, but which is removed easily by benzol. It comes in various size containers ranging from barrels down to 1-gal. cans.

— 305 —

Compressor, Air, Tractor-Mounted

Pontiac Tractor Co., Pontiac, Mich. [Vol.69,p.217]

This self-propelling, four-wheel air compressor will haul heavy loads in addition to its regular function. The compressor used is a Quincy type



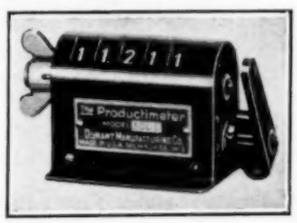
W-4 of 124 cu.in. displacement. It has a separate radiator with pump-driven circulation. The compressor has a three-bearing crankshaft and force-feed lubrication. It is mounted on a frame that attaches to either the McCormick-Deering or Fordson tractors. Power is taken from the tractor to drive the compressor.

— 306 —

Counter, "Productimeter," Model 5DD1

Durant Manufacturing Co., 655 Buffum St., Milwaukee, Wis. [Vol.69,p.256]

This counting device is adapted to small drill presses and printing presses. Special replaceable bronze bushings are used. The drive sleeve has been



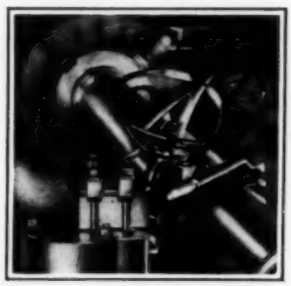
designed to prevent racing of the counter when operated at high speed. A drop-forged lever, which can be set at any angle, operates the counter. The device can be furnished with right- or left-hand drive and with a right- or left-hand reset, having either rotary or reciprocating action.

— 307 —

Cutting Tools, "Carboloy"

Carboloy Co., Inc., 350 Madison Ave., New York, N. Y. [Vol.69,p.633]

"Carboloy," developed in the research laboratory of the General Electric Co., Schenectady, N. Y., is composed of tungsten



carbide and cobalt. Hadfield's manganese steel has been found to yield easily to cutters made of this material, and also molded materials containing metal inserts can be cut, 11,000 parts being finished, in one case, before the tools required sharpening. "Genelite," composed of copper, tin and carbon, which is soft, but also highly abrasive, can be cut with carboloy without a taper.

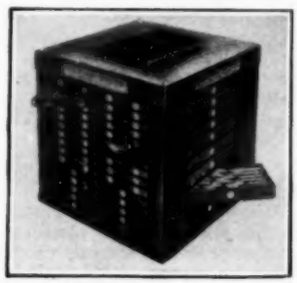
The same feeds and speeds can be used for the surface as for the sub-surface cuts on cast iron. Carboloy will scratch glass and its hardness runs about 2,000 Brinnel. It has a tensile strength of 275,000 lb. per sq.in. The material retains its strength and hardness at elevated temperatures. Tools have been observed cutting nickel steel when the point of the tool was at a bright red heat, without showing any ill effects.

— 308 —

Drill Case, "Ideal"

Union Twist Drill Co., Athol, Mass. [Vol.69,p.824]

Wire size drills from Nos. 1 to 80 inclusive and jobbers' drills from $\frac{1}{2}$ to $\frac{1}{4}$ in. by sixty-fourths of an inch may be stocked in the "Ideal" drill case. Bit stock drills may be kept in the top. Each drill size



is marked on the respective drawers. The drawers holding wire sized drills are arranged so that odd-numbered drills are in one vertical column and even-numbered drills in the other.

Each drawer is made of one piece of sheet steel and swings at one corner. It can be pulled out so that all of the contents are seen easily. It cannot be dropped, and the drawer cannot spill. The case is less than 14 in. high and each side is 12 in. wide.

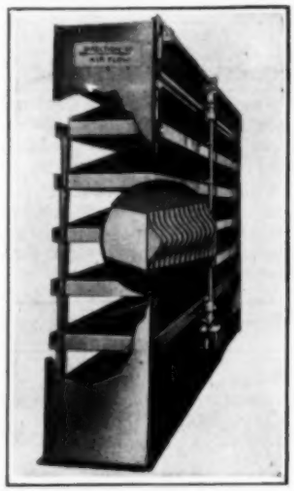
Weight, 38 lb. net.

— 309 —

Filter, Air, Horizontal, "Sinuous" Model S-H

Midwest Air Filters, Inc., Bradford, Pa. [Vol.69,p.900]

Capacity of from 3,000 to 3,500 cu.ft. per min. per cell, and an efficiency from 96 to 99 per cent are the features of this air filter. The illustration shows a large set-up having many cells. Air enters from the bottom of each cell and passes through a



sinusoidal path. The energy used in accelerating the airflow is not dissipated, but is regained by application of the venturi principle, and is transmitted unimpaired to the outer air stream. The resistance of the filter is 0.25 in. water gage, and the size of the cell is 29x19$\frac{3}{8}$x3$\frac{1}{4}$ in. Cleaning is done by means of "Viscosine" fed through flooding pipes, which travel over the cells at the rate of 8 in. per minute.

— 310 —

Firepot, No. 70

Clayton & Lambert Manufacturing Co., 6282 Beaubien St., Detroit, Mich. [Vol.69,p.788]

A pair of heavy coppers may be heated and a pot of metal may be melted at the same time on the No. 70 firepot. Low-gravity gasoline is used at the rate of $\frac{1}{4}$ gallon per hour by the circular burner. The detachable vaporizing generator has a

cleaner tip to keep the orifice clean. The tank is coated inside and out with tin. No. 60 size is designed to melt metal uniformly and takes a 6-in. pot.

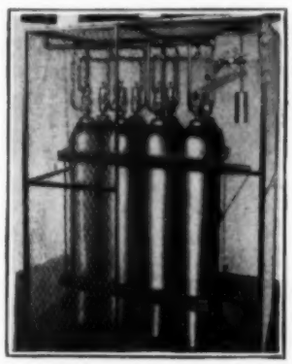
The weight of No. 60 is 15$\frac{1}{2}$ lb.; No. 70, 17$\frac{1}{2}$ pounds.

— 311 —

Fire Extinguishing System, "Alfite"

American - LaFrance and Foamite Corporation, 250 West 57th St., New York, N. Y. [Vol.69,p.750]

This system of carbon-dioxide protection against fire consists of one or more cylinders containing the extinguishing material confined in a liquid state. The cylinders are 51 in. in height and 8$\frac{1}{2}$ in. in diam., and the pressure within them is 900 to 1,000 lb. per sq.in. When placed in operation, a



plunger ruptures a copper disk on a cylinder and causes the gas to escape through piping to nozzles located at the fire. The system may be operated manually, semi-automatically, or automatically, by means of a variety of operating devices.

— 312 —

Floodlight Attachment

Prest-O-Lite Co., Inc., 30 East 42nd St., New York, N. Y. [Vol.69,p.414]

Floodlighting of night work is the purpose of this design. It is intended for use with small

tanks of dissolved acetylene. Compact and simple construction are features.

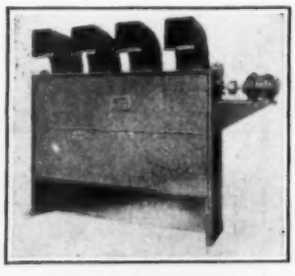
The attachment is placed near the axis of the tank so that it may be used as a handle. A universal adjustment is obtained with one swing joint. An improved burner, which will not "carbon up," is placed at a fixed focal point and requires no adjustment.

— 313 —

Heaters, Industrial, Unit, "Sirocco"

American Blower Corporation, Detroit, Mich. [Vol.69,p.901]

These industrial unit heaters, for floor and ceiling application, both high- and low-pressure types, are being marketed by the trade name of "Sirocco." The fan assembly consists of a



battery of duplicate double-inlet Sirocco fans, which can be removed easily. The heating element is composed of staggered rows of copper fin tubes expanded into one-piece, cast-iron headers.

The heating element having four rows of tubes is supplied for low- and medium-pressure operation, and one with three rows of tubes is furnished for high-pressure installations. The unit may be furnished with pipe coils if desired.

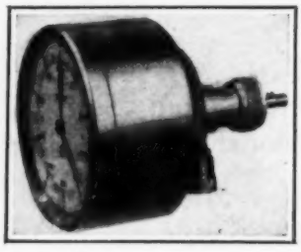
The motor is supported on a sheet-steel bracket in such a manner as to be accessible for inspection and oiling. Both motor and fan shafts are mounted upon self-aligning ball bearings.

— 314 —

Meter, Running-Time, "Hasler Tel"

R. W. Cramer & Co., Inc., 136 Liberty St., New York, N. Y. [Vol.69,p.672]

The running time of a machine is registered and totalized accurately and dependably by this meter, which is marketed in the United States by the above company. It is unaffected by vibration, temperature, magnetism, or gravity, according to the manufacturer. The device can be driven from any rotating member of the machine and registers with equal accuracy in both directions.



The meter is made in three sizes, calibrated to register respectively up to 100 hours and repeat, 1,000 hours and repeat, and 10,000 hours and repeat.

— 315 —

Pencil, "Multi-Vider"

Ruxton Multi-Vider Corporation, 2445 Graybar Building, New York, N. Y. [Vol.69,p.824]

This combination slide rule and automatic pencil has an overall length of 6½ in. and measures $\frac{7}{16}$ in. across the flats. Multiplication, division, per-

centages, and proportions can be done for estimation purposes.

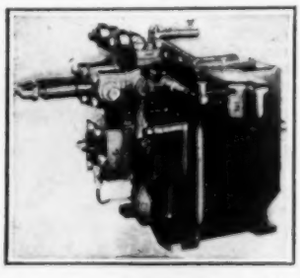
The hexagon barrel is of Bakelite, and is split in half. Two pairs of scales are used. The pencil movement is controlled by a movable sleeve. The lead may be propelled positively in either direction. An eraser is furnished in the cap. All exposed metal parts are 14-karat gold filled, while the interior parts are of nickled-plated spring brass. In the interior is a lead storage chamber.

— 316 —

Pump, Variable-Delivery, Type M D

Oilgear Co., Milwaukee, Wis. [Vol.69,p.74]

This improved pump is incorporated in the No. 3 high-speed broaching machine described on page 72, Vol. 69, of the *American Machinist*. The displacement of the pump is 17.1 cu.in.



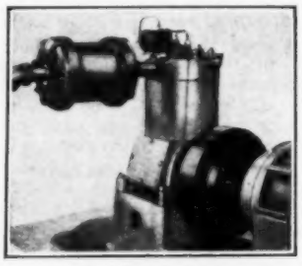
per rev. at a normal working pressure of 700 lb. per sq.in. A peak pressure of 900 lb. per sq.in. can be obtained. The operating speed varies from 700 to 730 r.p.m. A 15-hp. motor is required.

— 317 —

Silencer for Air Compressors, Model D

Maxim Silencer Co., Hartford, Conn. [Vol.69,p.375]

The noise originating in the discharge side of small high-speed compressors may be eliminated by this silencer. It



is compact and easy to install. Connection is made by means of standard pipe. The casing is designed to withstand 125 lb. per sq. inch.

— 318 —

Steel, Die, "Cromovan"

Firth-Sterling Steel Co., McKeesport, Pa. [Vol.69,p.335]

Resistance to machining in the annealed state has been reduced in this high-carbon, high-chromium alloy steel. According to the manufacturer, this has been brought about without sacrificing the ultimate hardness after final heat-treatment.

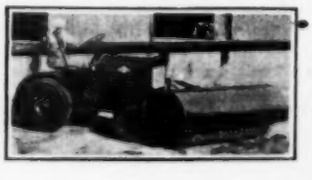
Annealed "Cromovan" has a maximum hardness of 210 Brinnell, 35 Schleroscope (Shore Model C), 97 Rockwell B, or 23 Rockwell C. Extreme hardness is produced whether quenched in air, oil or water.

— 319 —

Sweeper, Factory, "Clarktor"

Clark Tructractor Co., Battle Creek, Mich. [Vol.69,p.1017]

Cleaning of factory and warehouse aisles, walks, platforms, and also snow-removal, can be done by means of this "Clarktor" sweeper. The machine sweeps a path 5 ft. wide, the brush revolving at 120 r.p.m. The position and angle of the brush are adjustable quickly, thus making the machine suitable for sweeping both narrow and wide aisles. A dust con-



tainer is provided over the brush.

The sweeper is built on the regular chassis of the Clarktor, and has a self-starter, head lights, and full electrical equipment. The length of the brush is 6 feet.

Overall length, 127 in.; overall height, 64 in.; width, 82 inches.

— 320 —

Tachometers, Improved, "O-Z"

O. Zernickow Co., 15 Park Row, New York, N. Y. [Vol. 69,p.1017]

Three improved tachometers for measuring rotative and surface speeds have been placed on the market in the United States by the above company. The hand tachometers are of the single-spindle, triple, quadruple and quintuple, selective-range type. The lowest rotational

speed that can be measured by any model is 20 r.p.m. and the highest is 40,000 r.p.m. The weight is 12 oz. Surface speeds from 20 to 2,650 ft. per min. can be measured on the "Cutmeter" which has a large diameter wheel for engaging the work. Gear shifting of the improved model is obtained by rotating the barrel.

— 321 —

Toolrest for Commutator Resurfacers

Ideal Commutator Dresser Co., Sycamore, Ill. [Vol.69,p. 518]

Stones for resurfacing commutators may be carried in this toolrest, which is available in lengths from 6 to 28 in. Those 14 in. or smaller in size have two supports, while the 16-in.

or longer bases have three supports. Supports are L-shaped or T-shaped, the former being 2 or 3 in. high and the latter 3 in. high for attaching to round brush arms. Flat supports can be substituted when necessary to attach to flat brush arms. Each base has a large diameter wheel to facilitate easy operation of cross feed, and also a screw in-feed adjustment. Stones 2x2-in. face or smaller of any length may be accommodated.

— 322 —

Undercutter, Mica, Commutator

Ideal Commutator Dresser Co., Sycamore, Ill. [Vol.69,p. 175]

This device will operate in a space 3 in. wide without removing any brush rigging. It is driven by ¼-hp. motor operating on a.c. at 110 or 220 volts, 60 cycles. It can be used on either large or small commutators.

The device will slot commutators to approximately ¼ in. from the risers. The saw speed is comparatively slow. A depth gage is placed next to the saw, and the device also has a micrometric adjustable guide, which is constructed so that only one slot need be cut by hand.

The gear casing is grease-tight, and the apparatus may be suspended at any angle. Either a ¾-in. milling cutter or saw is recommended. The equipment consists of a No. 5x4 shaft and sheath, the undercutter head, twelve circular saws or four 50-deg. milling cutters and the motor.

— 323 —

Torch, No. 32

Clayton & Lambert Manufacturing Co., 6282 Beaubien St., Detroit, Mich. [Vol.69,p.824]

The powerful burner on this No. 32 torch will burn the lower grades of fuel. A wire tip is attached to the needle and passes through the orifice every time

the valve is closed, thus cleaning away any accumulation of carbon and insuring free passage of gas. The tank is balanced, and is made of heavy-gage drawn brass.

— 324 —

Valve, Compressor, Air-Cushioned, Improved

Pennsylvania Pump and Compressor Co., Easton, Pa. [Vol. 69,p.72]

The guard and seat are secured together by retaining rings instead of by screws, thus making the valve interchangeable in both the inlet and discharge assemblies of air compressors. The valve consists of four principal parts, seat, guard, disks, and springs. The seat is a close-grained casting and the guards are of special malleable metal. Tough-tempered spring steel is used for the valve disks, which are guided by a number

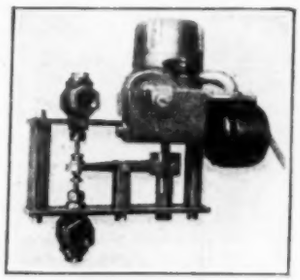
of columns on the guard. Their movement is accelerated by small spiral springs. The valve has an air-cushion pocket in the guard.

— 325 —

Valve, Motor-Operated, for Chromium Plating Tanks

St. Louis Motor Valve Co., St. Louis, Mo. [Vol.69,p.520]

Automatic temperature control of chromium plating tanks is aided by the use of this motor-operated valve. A special, totally-inclosed, reversible motor drives a threaded shaft through a double worm-reduction gear mechanism. A lever connected to this shaft and pivoted in its center is arranged to operate two valves alternately, one for steam and one for water. A limit switch stops the motor at the proper positions.



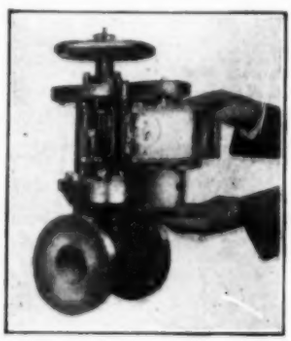
The complete control consists of a contact-making thermometer, a relay panel and the duplex valve unit. The thermometer contains two contact points. The relay panel consists of two small contactors with series resistances.

— 326 —

Valve Mechanism, Motor-Driven

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol. 69,p.787]

Valves up to 6 in. in diam. can be operated automatically by means of this motor-driven mechanism, which has a rating of 15 ft.-lb., and can be operated



from either float switches, temperature controlling devices, or pressure regulators. While designed primarily for valve service, it is adaptable to miscellaneous applications where remote control is desired.

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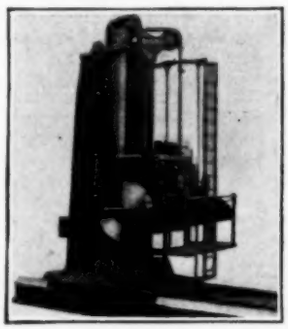
Boring and Milling Machine, Horizontal

Selson Engineering Co., Ltd., Hatton Garden, E.C., London, England. [Vol.68,p.226E]

This machine is manufactured by Collet & Engelhard, Offenbach-on-Main, Germany. The spindle is 7 in. in diam., and has a total feed of about 5 ft. The motor is reversible, and has push-button control.

The spindle runs in bronze bearings. It has automatic feed and quick hand adjustment and return. The column has rapid power adjustment on the bed, the speed for this and for the rapid traverse being about 4 ft. per min. The minimum height of the spindle above the bed is 22 in., and the maximum height is about 10 ft. The horizontal movement of the column on the bed is about 13 ft., the length of



the bed itself being about 21 feet.

The various boring and milling feeds are reversible. All levers are centralized. The speed of the boring spindle varies from 1.3 to 120 r.p.m., and the faceplate has an axial adjustment of 2½ in. The eight boring feeds range from 0.007 to $\frac{1}{16}$ in. per rev., and the maximum diameter bored is 55 in. The maximum diameter flanged is 65 inches.

The entire mechanism can be examined after the removal of a cover. The milling and drilling feeds are interlocked as well as the rapid traverses. Reversing feed mechanisms are fitted.

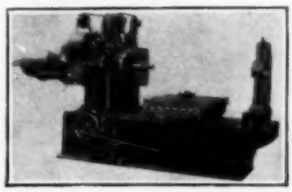
— 2 —

Boring Machine, Horizontal, with Traveling Spindle, General-Purpose

H. W. Kearns & Co., Ltd., Broadheath, England. [Vol.69, p.70E]

Boring and facing can be done simultaneously on this standard surfacing, boring, milling, drilling, and tapping machine with traveling spindle and automatic chuck. The traveling spindle and the facing chuck will work independently or simultaneously and the spindle has a reverse motion for tapping. The facing slide is of the flat, slotted type, and two tools may be in operation simultaneously.

The drilling and boring spindle has a traverse of 24 in. at one setting, or 48 in. at two settings, and the machine will face work



up to 30 in. in diam. Eight reversible speeds are provided for the facing slide, the spindle, the vertical traverse of the table slide, and the longitudinal and transverse motion for the table, with rapid power traverse of all motions. The feeds range from 8 to 96 cuts per in., and the spindle speeds number 24, ranging from 250 to 3.1 rev. per minute.

The machine is driven by a 5-hp. motor through a detachable gearbox. The vertical traverse of the sliding table is 20 in. and the maximum distance from the center to the main table is 28 inches.

The main table itself is 48x30 in., and the detachable table 36 in. square, the longitudinal traverse of the tables being 48 in. and the transverse motion 37 in. The boring stay has power vertical adjustment simultaneous with the movement of the spindle slide, the maximum distance between the facing slide and the boring stay being 5 ft. 6 in. The machine will take boring bars up to 3½ in. in diam. A grinding attachment with a snout 18 in. long is shown.

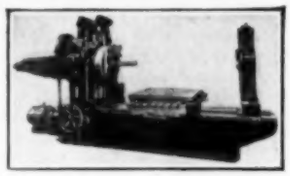
On mild steel the machine will cut ½ in. deep with $\frac{1}{32}$ in. feed at 40 ft. per min., and when operating with the facing slide on a diameter of 12 in. Weight 14,200 lb. net.

— 3 —

Boring Machine, Horizontal, Improved

Pearn-Richards & Co., Ltd., Broadheath, England. [Vol.69, p.120E]

The head of this boring machine has been inclosed, and the disposition of the operating levers changed to give more convenience in operating. Further, the bed ways and the screw and main feed shafts running in the bed are completely protected from chips. The drive is by a



direct-coupled motor to an eight-speed gearbox at the base. These speeds are transmitted to the spindle by belt, and there are eight direct speeds and a further sixteen speeds by means of a two-speed gear change in the head. A foot brake is provided.

The main feed transmission is from the spindle giving a total of eight changes by means of a two-speed reduction and a gate change of four speeds at the front, these changes being reversible.

At the rear of the head, the automatic longitudinal traverse of the spindle is engaged. These motions are entirely independent, but may operate together if boring and facing is required at the same time. Rapid power traverse can also be engaged to operate the same movement. It interlocks with the automatic feed.

The spindle can, with resetting, be traversed a distance of 5 ft. The facing capacity is 3 ft. 6 in., and the length admitted between the facing slide and the outer support is 6 ft. 9 inches

A 10-hp. motor is required.

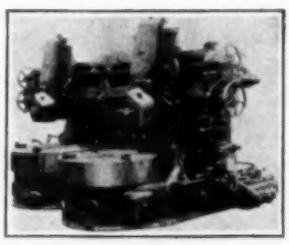
— 4 —

Boring and Turning Mill, Vertical, Duplex, 48-Inch

Webster & Bennett, Ltd., Coventry, England. [Vol.69,p. 102E]

This 48-in., high-power, duplex, vertical boring and turning mill has a special locking mechanism for the turret, the object being to insure rigid fastening and at the same time provide a locating device which retains its accuracy. This is effected by binding the turret solid with its slide by means of a contracting band.

The turret is a steel forging having five faces. A geared



revolving mechanism enables any station to be indexed quickly and the head has setting surfaces to locate the central position over the chuck for boring. The swivel slide may be set for taper boring or turning. Both the turret slide and saddle may be locked for surfacing and boring respectively. The feeds which operate vertically, horizontally, and angularly are positive, reversible, and interlocking. Ball thrusts are fitted. Rapid power traverse is available in all directions.

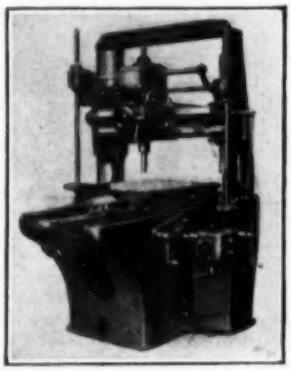
— 5 —

Boring Machine, Vertical, Jig, "Carson"

Charles Churchill & Co., Ltd., London, E.C., England. [Vol. 69,p.121E]

Boring and reaming from $\frac{1}{16}$ to 3 in. can be done on this machine, which has a table having a working surface of 30x20 in., and a maximum distance between the table and the end of the spindle of 20 in. The spindle has an automatic travel of 4½ in. and a cross traverse of 20 in., its eight speeds ranging from 25 to 600 r.p.m., and it has eight feeds. Distance pieces or gage blocks are employed for setting purposes and the machine is suitable for small-lot production to fine limits as well as for jigs.

Two sets of center distance pieces are available, for the location respectively of the table and the spindle head, each set com-



prising 42 pieces and enabling distances to be obtained from 0 to 30 in. by steps of 0.0001 in. The spindle head is moved along the arm by rack and pinion, the exact location of the spindle being obtained by the use of an optical position finder.

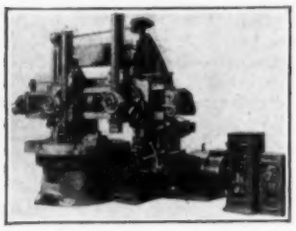
The drive to the machine is by a single pulley and sliding gears provide the speeds and feeds. The clutch-operating device also controls the gear changing mechanism.

— 6 —

Boring Mill, Vertical, Double-Spindle, "Hilomill"

J. Stirk & Sons, Ltd., Halifax, England. [Vol.69,p.121E]

The 72-in. "Hilomill" has a table 56 in. in diam. and will admit 33 in. under the tools. It



is driven by a 10-hp. variable-speed motor, coupled to three-speed main gearing by double-helical reduction gearing. The table speeds range from 2.46 to 93 rev. per minute.

Among the main features are the quick power traverses to the heads controlled by pendent switch, while hand movements are provided to the heads in all directions, including a rack movement to the rams by large star handwheels. The power traverses are provided in all directions by two supplementary motors. Another feature is the worm drive to the table.

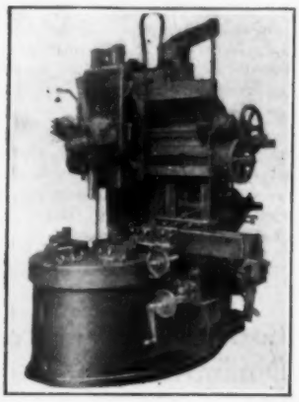
The housings of the machine are bolted and pinned on the wings of the body and tied at the top by a deep crossrail. Independent feed boxes, one at each side, are provided for the head, the range of feeds in nine steps, being from ☆ to ⅜ in. per rev. The feeds apply in vertical, angular, and horizontal directions, and are variable and reversible. The cross-slide is elevated by one of the supplementary motors.

— 7 —

Boring Mill, Vertical, with Side Head, 36-Inch

Ward, Haggas & Smith, Keighley, England. [Vol.69,p.223E]

The base and column are cast in one piece for stability, and the column is internally ribbed to prevent vibration. The side rail is bolted and gibbed to the column, and is adjustable vertically by power in conjunction



with the cross rail. For taper turning and boring, the main hexagon turret head swivels through 45 deg. on each side of the vertical center. It can be moved rapidly in the vertical, angular, or horizontal directions. The side head can be used throughout the entire range of the machine. It carries a square steel tool turret on a cast-steel ram. Both heads are balanced. Independent automatic feeds are available for the main and side heads, eight changes being provided through the gear box. The worktable, 36 in. in diam., is driven by constant-speed pulley and gears. A four-jaw independent chuck is built into the table.

Work up to 38 in. in diam. can be machined with the side head, the machine admitting work 26 in. deep under the cross rail and 46 in. deep under the vertical turret face. The vertical movement of the main turret is 26 in., the horizontal movement being 22 in., and the side turret has a total vertical movement of 19½ in. The maximum distance of side turret over the table is 20 inches.

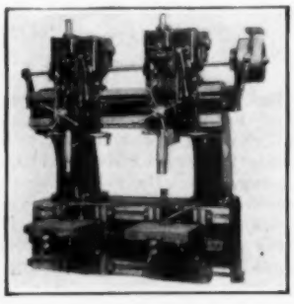
Weight 7½ tons.

— 8 —

Boring and Drilling Machine, Vertical, Two-Spindle

Kitchen & Wade, Halifax, England. [Vol.68,p.217E]

This two-spindle drilling and boring machine is specially adapted for heavy locomotive work. The base is of deep box section, having planed guide ways at the front for supporting the two adjustable elevating work-tables, 24x21 in., and their aprons. The two box-section



standards carry a deep-section cross-slide bearing the two drilling heads on ball bearing rollers. The rack and pinions are of steel.

The maximum center distance between the two spindles is 5 ft. 3 in., minimum centers 2 ft. 2 in., and the maximum height of work admitted is 3 ft. 8 in. The spring-balanced spindles are bored to No. 5 Morse taper, and have a vertical feed of 18 in. The six spindle speeds, available through gearboxes on the saddles, range from 200 to 30 r.p.m. The four feeds vary from 136 to 42 cuts per in. They are applied through a friction clutch. Quick and fine hand adjustments are provided.

The drive is by belt from fast and loose pulleys to gearboxes on the drilling heads and thence by spirals, to the spindles. The machine is fitted with rotary pump and fittings for coolant.

Weight 6½ tons.

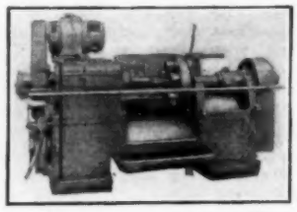
— 9 —

Boring and Facing Machine, Semi-Automatic, Four-Spindle

B.S.A. Tools, Ltd., Sparkbrook, England. [Vol.69,p.80E]

This four-spindle machine is of the semi-automatic type, the four tool spindles carrying boring and facing tools. The drive is by motor and belt through a Johnson friction clutch, the four spindles being driven by gearing. The faceplate carries five detachable chucks to suit the work in hand. They are of the split collet type, quickly operated by a special gear device. The extra chuck forms a loading station.

The turret has five indexing bushings, one of which rides on to a fixed locating plunger each time the turret is moved forward, thus locking the turret



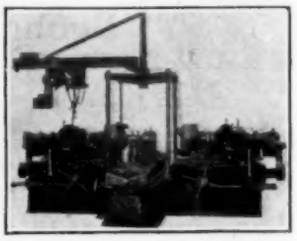
automatically and forming a support. An adjustable slide block enables the machine to deal with the work of various lengths without change in the cam position or overhang of the tools. The cam drum for feeding the work forward is mounted at the turret end of the machine. Attachment for tapping purposes can be applied to one of the spindles. The largest chucking diameter of work is 6 in., the maximum swinging diameter 7½ in., the turret travel 8 in., and the working travel 3½ in. The pitch diameter of the chucks in the turret is 13 in. The machine is 8 ft. 6 in. long by 4 ft. 3 in. wide by 3 ft. 10 in. high.

— 10 —

Boring Machine, Axle Box, Duplex

H. W. Kearns & Co. Ltd., Broadheath, Manchester, England. [Vol.69,p.86E]

This duplex machine for boring and facing axle boxes has two headstocks mounted on pedestal beds bolted to a central bed. The main table is 23 in. wide by 84 in. long, and will carry two jigs so that one axle box can be machined while the other is being set up.



Each headstock is driven by a single pulley through gearing. The automatic facing chucks employed will machine from the maximum diameter of 24 in. to 0 at one setting. The facing slides are of the T-slotted type, taking facing and boring tools, and the two facing toolholders may be operated simultaneously. The toolholders have automatic variable feed in both directions and fine adjustment by hand. The heads which carry the facing chucks have reversible automatic feeds in line with the axle box center, both motions having self-acting knock-offs. The horizontal traverse of each headstock is 18 in., with four reversible feeds, while the facing chucks run at six speeds, from 10 to 60 r.p.m. The distance from the center of the facing chucks to the table top is 19 inches.

The machine is suitable for boring out axle boxes with the keep in position if required, and is centered on the facing chuck by a spigot. Snout boring tools are used, the snout, which will carry four tools, being of cast steel.

Floor space required 14 ft. 6 in. by 10 ft.; weight 12,000 lb. net.

— 11 —

Boring and Facing Machine, Pipe-Flange

William Heap & Co., Ltd., Ashton-under-Lyne, England. [Vol.69,p.188E]

This machine has 14 in. centers and will take pipe 11 ft. long, facing flanges up to 22 in. diam., and turning on the outside diameters up to 20 in. The pipe may also be bored. The machine need not be stopped in order to bring the heads back. Each head is driven independently by a 7-hp. motor. If

desired, the machines may also be driven by cone or single pulley.

A gear-box at each end provides six spindle speeds, the drive being transmitted through a friction clutch. Six boring speeds are available, and two facing feeds are provided. The jaws that grip the pipes are of the self-centering type, with

right- and left-hand screws. The heads can be moved along the bed by rack and pinion. Screw-cutting can be done if suitable gears are provided.

Floor space 21 ft. by 4 ft. 7 in.

Drilling Machines

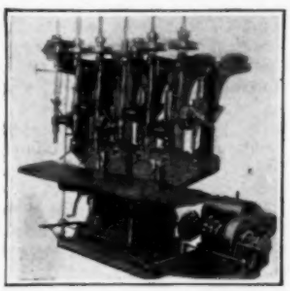
— 12 —

Drilling Machine, Sensitive, Ball Bearing, Six-Spindle

Jones & Shipman, Ltd., Leicester, England. [Vol.69,p. 62E]

This six-spindle ball-bearing sensitive drilling machine represents a range of models manufactured by the above company for drilling holes from $\frac{1}{8}$ to $1\frac{1}{8}$ in. in diam. in steel. Similar machines are also made in single-, two-, and three-, and four-spindle types, and they are mounted on ball bearings throughout. The heads may be supplied plain, with 3-to-1 reduction gears for tapping reverse.

Sliding gears are employed for the three feeds. Holes can



be drilled at the center of 18 in. in diam., and the length of feed is 6 in., the sliding head having an adjustment of $9\frac{1}{2}$ in., and the table of 21 in. The heads are spaced 12 in. apart.

Six speed changes are effected by a cam-operated back-carriage. These range from 497 to 2,618 r.p.m. A pump is provided. The machines can be arranged for direct drive by motor. On the four- and six-spindle models, a pedal at each end permits the operator to control the main drive instantly. The six-spindle machine has a table with a working surface of 72x17 inches.

Floor space occupied without motor 86x36 in.; weight, with plain head, 3,400 lb., net.

— 13 —

Drilling Machine, Sensitive, All-Geared, 25-Inch

Jones & Shipman, Ltd., Leicester, England. [Vol.69,p. 77E]

Holes have been drilled 1 in. in diam. and 4 in. deep in tough steel forgings on this machine.

The spindle has a vertical feed of 6 in., the distance from the center of the spindle to the column being $12\frac{3}{8}$ in. With the four-speed gearbox, the range of spindle speeds is from 250 to 720 r.p.m. The gearbox is fitted on top of the head and employs chrome-nickel gears and hardened steel dog clutches.

The column, head, and spindle bracket are one casting. The rectangular table is integral with the bracket, and has a working surface of 20x14 in., with a vertical adjustment of 20 in. The drill spindle is bored for No. 3 Morse taper, the maximum and minimum distances of the nose from the spindle being 30 and 4 in., respectively. The power required is 2 hp. The base of the machine measures 35½x20 in., and the height overall is 80 inches.

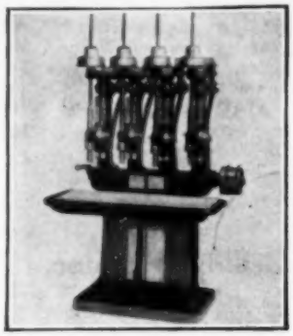
Weight 830 lb., net.

— 14 —

Drilling Machine, Multiple-Spindle, Sensitive, Manufacturing

F. Pollard & Co., Ltd., Leicester, England. [Vol.69,p. 82E]

The line includes a single-spindle machine and one three- and one four-spindle machine. All are suitable for continuous production on jig work and for employing multiple drill heads and special tools for drilling and tapping. Four types of spindles are available. These are: Plain belt spindle, plain geared spindle, geared reversing spindle, and spindle with instantaneous positive automatic feed. The vertical movement of the



spindles is 5 in., and the center distance from the column face is $7\frac{1}{8}$ in. The center-to-center distance is 9 in. The speeds of the plain belt spindle range from 385 to 1,092 rev. per minute.

The table is raised and lowered by telescopic screw, and has a working area of 15x40 in. on the four-spindle machine. The spindles are bored No. 2 Morse taper and drill up to $\frac{13}{16}$-in. holes.

— 15 —

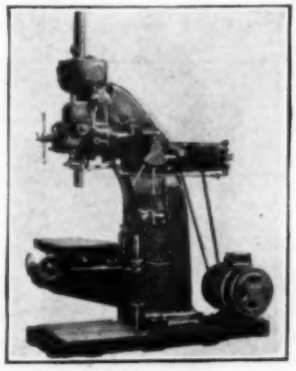
Drilling Machine, Vertical, High-Power, 36-Inch

Williams Asquith, Ltd., Halifax, England. [Vol. 69,p.67E]

Admitting work under the spindle up to 36 in. diam., this high-power vertical drilling machine is suitable for railway carriage and wagon work, and its power makes it suitable for fixture work in quantities, multiple-head work and single-drill flange drilling.

The compound movement enables the work to be quickly brought to position. The knee is heavy and the gearbox gives a range of 18 speeds. Changes can be made while the machine is running. Ball thrust bearings take the spindle thrust in both directions. Both quick hand adjustment and fine feed are available, while a self-acting variable feed is obtained through the feed box on the head. The feed is started and stopped through a friction clutch, and may be applied lightly to drive small drills.

Four feeds are provided, ranging from 35 to 120 cuts per in. The spindle is bored



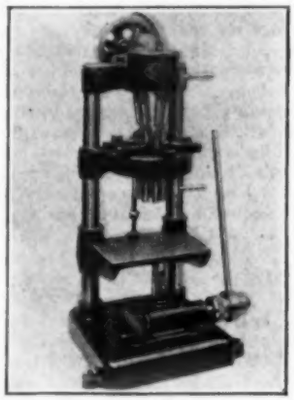
No. 5 Morse taper, and the table provides a longitudinal traverse of 2 ft. and a transverse traverse of 1 ft. $1\frac{1}{2}$ in., while the vertical adjustment available is 1 ft. The maximum height admitted under the spindle from the table top is 2 ft. 9 inches.

— 16 —

Drilling Machine, Bench, Six-Spindle

B.S.A. Tools, Ltd., Sparkbrook, Birmingham, England. [Vol.69,p.66E]

Designed for drilling small components, this six-spindle drilling machine has the capacity for six $\frac{7}{16}$-in. or four $\frac{1}{2}$-in. holes in steel, or six $\frac{1}{2}$-in. holes



in cast iron. The head and spindles are fitted at a given height so that direct drive is possible, and the table is raised to the drills by rack-and-pinion motion. The table has an area 10 by $5\frac{3}{4}$ in. with a maximum travel of 4 in., maximum distance from the table to the spindle nose being 7 inches.

The feed is regulated by hand, and the depth of drilling is controlled by an adjustable stop. Drive is from lineshafting. The spindle head is circular in form, covering a drilling area of from $1\frac{3}{8}$ in. minimum to $3\frac{3}{4}$ in. maximum pitch circle. The drills can be placed for holes with rectangular spacings within this area. The spindles are bored No. 1 Morse taper at the end and run in bronze bearings, the speed being 700 r.p.m. To compensate for drills of various lengths, independent adjustment up to $\frac{1}{4}$ in. is provided to the spindles.

Base 16 in. square; maximum height 33 inches.

— 17 —

Drilling Machine, Upright, 20-Inch

F. Pollard & Co., Ltd., Leicester, England. [Vol.69, p.99E]

This 20-in. upright drilling machine is suitable for drilling holes up to $1\frac{1}{2}$ in. in diam. The

back gears are totally inclosed and eight speeds are obtained. A friction clutch is introduced into the automatic feed transmission. The gear changes are controlled by a lever, three feeds being obtained by a plunger working over a quadrant with locating holes.

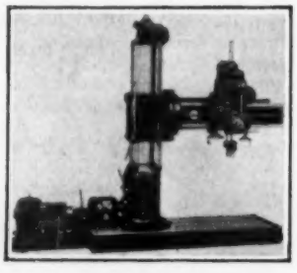
The transmission consists of two totally-inclosed gear boxes, the upper box, near the speed driving bevels, driving down by vertical shaft to the worm box. The change-speed gears on the top driving shaft are controlled by a lever. The tapping motion is controlled by foot.

— 18 —

Drill, Radial, Universal, 6-Foot

G. Swift & Sons, Ltd., Halifax, England. [Vol.68,p.207E]

Drilling, milling, boring, facing, tapping, and studding, can be performed on this machine. An auxiliary spindle is used for drilling very small holes at high speeds. The machine permits work 5 ft. 6 in. deep between the spindle nose and the baseplate, and the radial arm has a movement of 3 ft. The work-



ing surface of the baseplate is 6 ft. by 3 ft. 3 in. The column is mounted on ball and roller bearings. Holes up to 2¼ in. can be drilled in cast iron, and up to 2 in. in steel. The sleeve, on which the arm is fixed, can be swung through a complete circle.

The saddle travels on roller bearings. The spindle is bored No. 4 Morse taper, and has a traverse of 15 in. It swivels 40 deg. on either side of the vertical position, and has both hand and power feeds, quick advance and return, and reverse motion for tapping. Eighteen spindle speeds from 27 to 500 r.p.m. are provided through a nine-speed gear box and single and double gears. The drive is by a 10-hp. motor through a friction clutch.

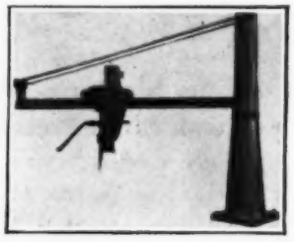
Floor space, 13 ft. by 3 ft. 3 in.; height 11 ft. 9 in.; weight 10,400 pounds.

— 19 —

Drilling Machine, Countersinking, Radial, Motor-Driven

Kitchen & Wade, Halifax, England. [Vol.69,p.17E]

This motor-driven, swing-jib, countersinking radial drill is used for countersinking holes up to 2 in. in diam., the length of the swing jib being 12 ft. 6 in. The pillar is circular allowing a full 360-deg. swing. The circular column has a special ball bearing. The saddle is mounted



on ball bearing rollers also, and incloses the driving gears, which run in thick oil or grease.

The steel spindle is ground, has a 9-in. vertical feed, and is bored to No. 4 Morse taper. The thrust is taken on balls. The spindle is balanced by an extended spring, which is adjusted so as to act as quick return. All adjustments are made by the pull lever. The driving motor is mounted direct on the saddle.

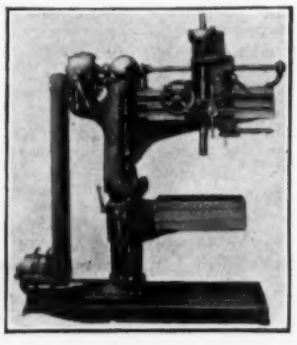
Weight 3 tons net.

— 20 —

Drilling Machine, Radial

F. Pollard & Co., Ltd., Leicester, England. [Vol.69,p.71E]

Two sizes of this radial drilling machine are made, namely, 36 and 48 in. radius. In addition to the low base, the machine has a column which car-



ries a work table. This has clamping surfaces at the top and side and may be swung clear when not required.

The arm swings on trunnions in a heavy top section composing the column. This carries the gearbox, which is belted to the motor. The nine speeds available range from 59 to 860 r.p.m. with a pulley speed of 500 r.p.m. Four feeds are provided by the gearbox on the spindle head, the range being from 54 to 185 cuts per in. A friction clutch may be operated instantly at any point. The vertical adjustment of the spindle is 12 in. In addition to the automatic feed, the usual hand motions are provided.

The base has a T-slotted area of 36x27 in. for the smaller machine, and the swinging table has a top surface of 25½x15½ in. for both machines, while the maximum distance under the end of the spindle with the table swung clear is 48 inches.

— 21 —

Drilling Machine, Radial, Girder, 6-Foot

William Asquith, Ltd., Halifax, England [Vol.69,p.81E]

The spindle saddle is carried on the arm by roller bearings on horizontal guides, a vertical guide giving additional rigidity. The column is ground. The six-splined spindle is supported

in all positions in the sleeve, and is balanced. A central handwheel operates the vertical adjustment, a slight pressure automatically engaging the power feed. A reverse motion of the handwheel disengages the power feed and then withdraws the drill.

The saddle is locked to the arm, and the arm to the column, by a single movement of a lever carried in front. When released, the arm has free movement on the column, ball and roller bearings being provided. It may be swung through a complete circle. The main speed transmission gears consist of a heat-treated steel worm and phosphor-bronze wormwheel running in an oil bath.

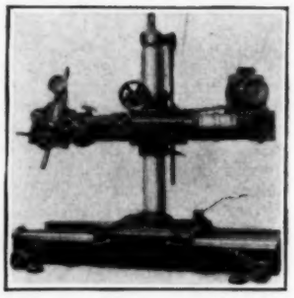
The greatest height admitted under the spindle nose is 4 ft. 3 in., and the vertical movement of the spindle is 14 in. The number of speeds and feeds are optional, the standard design providing for one speed and one feed, or three speeds or six speeds, and with one or three feeds.

— 22 —

Drilling Machine, Radial, Universal, Portable

Kendall & Gent, Ltd., Manchester, England [Vol.69,p.83E]

The motor mounted at one end of the arm drives the head at the other end. The drive accommodates itself automati-



cally to all positions of the drill head. The spindle has six gear changes, ranging from 43 to 300 r.p.m., and a reverse motion controlled by hand lever, gives an increased reverse speed at three times the forward speed. Feeds are positive, two changes being available for each spindle speed.

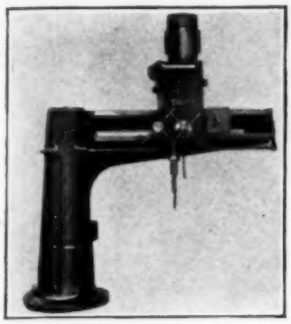
The steel spindle has its thrust taken by ball bearings and may be brought to drill holes vertically, horizontally, or at any angle. The arm can be moved radially through a complete circle, or may be tilted to any angle up to 30 deg. A further movement is for elevating and lowering by power or by hand. All movements are interlocked. To obtain portability, a heavy bed on wheels is provided. The maximum radius of operation of the drilling spindle is 4 ft. 9 in., and the highest distance of the spindle from the floor is 5 ft. for vertical drilling or 7 ft. 4 in. for horizontal drilling. The hand and power traverse of the spindle is 18 in. The column can be moved a maximum distance of 5 ft. 9 in., and a 3-hp. motor is required for driving.

— 23 —

Drilling Machine, Radial, Girder, 6-Foot

G. Swift & Sons, Ltd., Halifax, England [Vol.69,p.84E]

Designed for repetition work, this 6-ft. girder radial drill has one spindle speed, which is usually 300 r.p.m., but it can be arranged to meet requirements. It has one feed only, namely, 75 cuts per in. The drive is by



motor placed vertically on the top of the saddle. The power feed is applied by friction clutch. The travel of the saddle on the arm is 4 ft. 8 in., and the minimum radius of the spindle is 1 ft. 4 inches.

The spindle is fitted with radial ball bearings at the bottom end and a ball thrust washer at the top. It is bored No. 4 Morse taper, and traverses 15 in., the machine admitting 4 ft. 4 in. between the spindle and the floor. The saddle travels along the arm on roller bearings. The arm is carried on a ground pillar on which it revolves on roller and ball bearings. The motor transmits 5½ hp., and is arranged for 220-volt, d.c. circuits. A starter is carried on the right-hand side of the saddle.

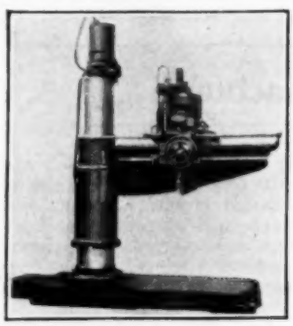
Weight 3,800 lb. net.

— 24 —

Drilling Machines, Radial, 6- and 7-Foot

William Asquith, Ltd., Halifax, England [Vol.69,p.100E]

On this machine the column has two diameters, the lower part being considerably the larger, and thus a separate sleeve is avoided. It is claimed a greater degree of rigidity is therefore obtained. A separate reversing motor drives the elevating and lowering motion. Safety trips limit the travel at each end.



A special two-speed motor drives the spindle through hardened and ground spur gears. A set of gears in the saddle gives 12 changes, and thus a total of 24 reversible speeds are available by means of the two speed changes. Holes up to 2-in. Whitworth can be tapped in steel. The automatic feed provides 12 changes and a power-operated feed when the motion is incorporated. Continuous lubrication by a cascade system is provided for all parts in the saddle. All electrical equipment for the spindle drive and the elevating mechanism is included as standard.

The 6-ft. machine has a maximum height of 6 ft. under the spindle, the vertical traverse of the spindle being 16 in. The speeds range from 21 to 720 r.p.m. The automatic feeds range from 9 to 235 cuts per in. These particulars also apply to a 7-ft. machine, with the exception of the vertical height under the spindle, this being 6 ft. 9 inches.

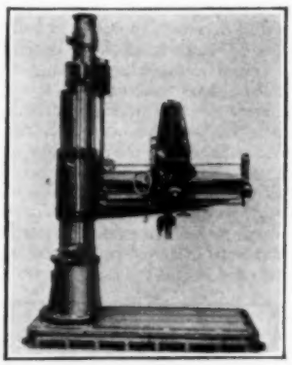
— 25 —

Drilling Machine, Radial, Heavy-Duty

J. Archdale & Co., Ltd., Birmingham, England [Vol.69,p.102E]

This machine will drill holes up to 3 in. in diam. in mild steel, and can be operated and controlled entirely from the saddle. The spindle minimum radius is 11½ in. and the maximum distance from the spindle to the base is 5 ft. 9 in., the feed traverse being 18 in. The drive is by a 7½-hp. vertical, d.c. flanged motor. The saddle has hand and power traverse.

The whole of the speed and feed change mechanism is mounted in the saddle, and all the control levers except the combined arm lock and elevating lever are located within easy reach. The spindle is balanced by a compensating spring, and is fully inclosed. A gearbox on the saddle, in conjunction with the double gear change on the spindle, gives a total of 12 spindle speeds. A high-speed drilling attachment, an extra, makes 24 speeds available.



Six rates of feed are obtainable through a quick-change feed box mounted on the saddle. In addition to power feed, sensitive feed controlled by the same lever is also available, and there are also fine and quick hand traverses. Safety trips prevent overtravel. The saddle mechanism is lubricated by means of pump circulation.

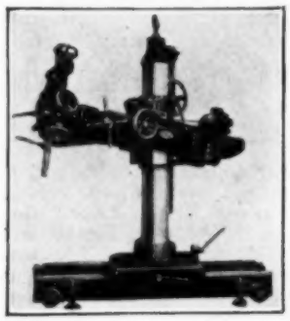
— 26 —

Drilling Machine, Radial, Universal, Portable, 6-Foot

Kitchen & Wade, Halifax, England. [Vol.69,p.105E]

Holes up to 2¼ in. can be drilled in cast iron on this 6-ft. portable radial drilling and tapping machine, which is self-contained. The machine is fully universal, and can be driven either by a d.c. or a.c. motor. Tapping up to 1½-in. Whitworth can be done. The minimum radius for drilling is 2 ft. 8 in. The maximum distance for drilling vertically is 6 ft. 6 in., and when drilling horizontally 9 ft. The minimum distance in the latter case from the center of the spindle to the floor is 1 foot.

The column has a traverse on the bed of 5 ft. and the base has ball-bearing rollers. The radial arm has both hand and power traverse vertically. The arm can be tilted up and down 30 deg., and is moved in and out by handwheel. The drilling head is fully-inclosed, and holes can be drilled at any angle by the means of two swivel motions. A gearbox and double gear provide six speeds in each direction, the range being from 300 to 40 rev. per minute.



Lever control is provided for tapping, the tap being reversed automatically at an increased speed. Two feeds are provided, namely, 160 and 260 cuts per inch.

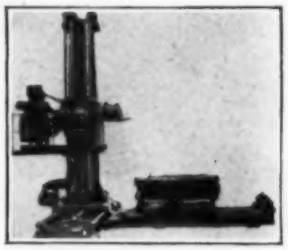
Weight 8,700 lb. net.

— 27 —

Drilling Machine, Firebox and Boiler-Shell

W. Asquith, Ltd., Halifax, England. [Vol.68,p.269E]

This motor-driven horizontal firebox and boiler-shell drilling machine deals with the vertical and horizontal seams of locomotive boilers and the butt straps of fireboxes. Three holes can be drilled simultaneously either in a horizontal or a vertical line. The bed on the left is 23 ft. long by 5 ft. 3 in. across the top by 15 in. deep. It has a horizontal movement of 15 ft. both by hand and power.



The second bed, which supports the worktable, measures 15 ft. by 5 ft. 3 in. by 15 in. deep. The drill-slide, carrying a two-to-one, variable-speed, 15-hp. motor, is raised and lowered by power on the column, and a three-speed gearbox gives a speed range of 140 to 600 rev. per minute.

The platform carries the electrical control. The three spindles are 1½ in. diam. The center spindle is stationary, but the two outer spindles can be adjusted to centers of 9 in. maximum and 5½ in. minimum. In addition, each of the outer spindles has angular adjustment by screws, with index. Each spindle is provided with feed motion along its own axis, and each has an automatic trip motion and three rates of feed, from 60 to 120 cuts per in. of traverse.

The worktable is 7 ft. 6 in. in diam., and can be rotated by power. It is adjustable 3 ft. along its bed by power. A canting motion permits tapered fireboxes and barrels to be drilled conveniently. Four auxiliary motors, each of 4 hp., are provided. The maximum distance between the spindles and the worktable is 12 ft. 6 in., and the minimum is 3 in. The floor space occupied is 26 ft. 6 in. by 22 ft., total height 26 ft.; weight 25 tons.

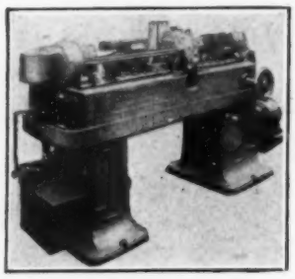
— 28 —

Drilling Machine, Horizontal, Four-Spindle

Alfred Herbert, Ltd., Coventry, England. [Vol.69,p.109E]

The four-spindle horizontal drilling machine illustrated is one of a line of multi-spindle machines developed by the above company. Speaking generally, the horizontal bed carries two or more heads around a central fixture for the work. The saddles carrying the drilling spindles are fed up to the work and returned by cam, and for repetition work camshaft-driven indexing fixtures are employed, the machine being fully automatic.

The main drive is through a



friction clutch which has six studs adjustable with springs so that the load transmitted may be adjusted to the work to be done.

During the operations of boring and reaming, the work fixture is located positively by the bar passing through it. The drills are held by quick-action chucks and the spindle speeds are varied through the motor. The machine is adaptable for fixtures of various kinds, and is available in three sizes, namely, 12, 16 and 24 in., these dimensions referring to the diameter of the piston drum holder.

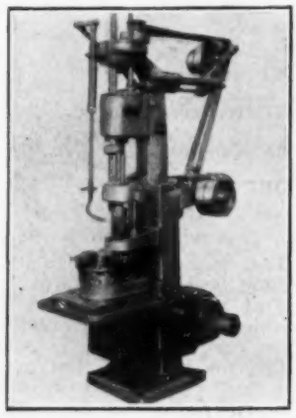
— 29 —

Drilling Machine, Vertical, Automatic

Alfred Herbert, Ltd., Coventry, England. [Vol.69,p.123E]

This automatic vertical drilling machine consists of the firm's standard ball-bearing drill with an attachment by means of which quick cam motion is given to the tools toward the work, followed by a slow feed for cutting and a quick rise at the end of the cutting stroke. The work fixture then indexes automatically to the next position. With the plain spindle, the machine will drill up to $\frac{7}{8}$ in. diam., or up to $1\frac{1}{4}$ in. in diam., with geared spindle, the latter counterboring up to 2 in. in diameter.

With the plain spindle the machine will tap up to $\frac{3}{4}$ in. in



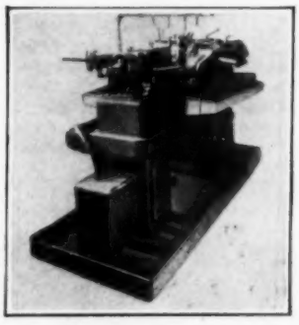
cast iron or $\frac{3}{4}$ in. in mild steel, while the geared spindle machine taps 1 in. in cast iron or $\frac{3}{4}$ in. in mild steel. The stroke of the spindle, which is controlled automatically by cam, ranges from $\frac{1}{2}$ to 3 in., the vertical adjustment of the head being 10 in., and the distance from the center of the spindle to the column $7\frac{1}{2}$ in. The automatic indexing jig has floating and quick clamping devices for loading. The jig is timed in relation to the vertical movement of the drill spindle. It has eight stations. Drilling takes place at one station and reaming at the next.

— 30 —

Drilling Machine, Horizontal, Six-Headed, Special

Alfred Herbert, Ltd., Coventry, England. [Vol.69,p.151E]

Apart from the two main heads, which are of a standard type, the machine carries four auxiliary heads, these heads



being adjustable for radial lateral and vertical and angular positions. It is claimed that these heads have almost universal movements. The machine shown was designed for drilling various holes in magneto bodies. The auxiliary heads are driven by $\frac{1}{6}$-hp. motors, and the feed is obtained by means of rack rods connected to the main heads.

The time cycle for drilling 18 to 22 holes is 40 sec. Some of the holes are $1\frac{3}{4}$ in. deep in aluminum. The machine is designed to give an intermittent feed, which may take place four or six times.

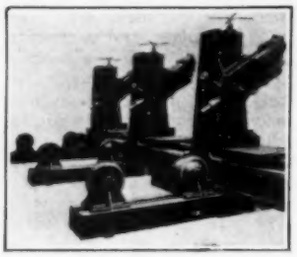
The fixture is of the duplex revolving type, work being loaded at one station while drilling is taking place at the other station. The time of the cycles can be increased or decreased according to requirements. The drills are held in special quick-acting chucks, which register each drill in its spindle.

— 31 —

Drilling Machine for Boiler Shells, Three-Spindle

Crossley & Co., St. Mary's Gate, Manchester, England. [Vol.69,p.152E]

This three-spindle machine for drilling boiler shells will deal with drums 4 ft. in diam.,



these being carried on rollers. The main bed of the machine is 38 ft. long and bears three columns, each carrying a self-contained drilling head complete with driving motor and starter. Six speeds are provided, together with four rates of feed with a traverse of 15 in. for each spindle.

The heads provided will drill holes from $\frac{1}{2}$ to $1\frac{3}{4}$ in. in diam. and will trepan up to 4 in. in diam. The saddles are fixed definitely at 30 deg. to the horizontal, and can be adjusted vertically. Each column can be moved along the bed by its own 3-hp. high-torque motor. For revolving and inching the boiler drums on the rollers a 5-hp. motor is provided and a system of markings on the column and roller slides gives ready indication of the position.

— 32 —

Drill, Electric, Portable, Three-Speed

F. Pollard & Co., Ltd., Leicester, England. [Vol.69,p.200E]

This "Contal," portable, hand-operated electric drill is driven by a universal electric motor, which has the main speed change effected mechanically by means of a disk, in which are drilled three concentric rings of holes, with one or other of which, as desired, a pinion of special tooth form can be caused to gear, thus providing speeds suitable for drills up to $\frac{5}{16}$ in. in diam.

The armature shaft runs in ball bearings. A ventilating fan insures cool running. Another feature is the use of swiveling handles.

Weight, 18 lb. net.

— 33 —

Drill, Rotating, Percussion

William Geipel, Ltd., 156-170 Bermondsey St., London, S.E., England. [Vol.69,p.199E]

This percussion rotating drill is intended to cut holes through walls. It is driven by hand and consists of a light frame with hand grip, the frame carrying the rotating spindle, which will accommodate drills and jumping bits of various sizes, and also a hammer head attached to a pivoted lever. Impulses are imparted to this head by means of a strong spiral spring.

It is claimed that this device imparts blows equivalent to those of a hand hammer at the rate of from 600 to 800 per min. The appliance is light, weighing less than 2 pounds.

Grinding Machines

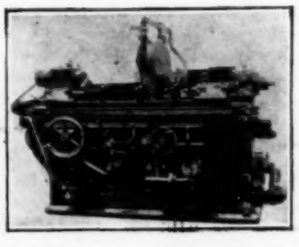
— 34 —

Grinder, Cylindrical Plain, Heavy-Duty, with Hydraulic Traverse

Churchill Machine Tool Co., Ltd., Broadheath, England. [Vol.69,p.99E]

This 10x36-in. plain grinder will swing work $10\frac{1}{2}$ in. in diam. over the table. It is intended for parallel and taper grinding, and for double wheel. formed wheel, and wide wheel grinding. It will carry a grinding wheel 30 in. in diam., and with this size the maximum diameter ground is 5 in. For larger work, a wheel 24 in. in diam. is employed. Two wheel speeds are provided and four work speeds, and for the drive a motor up to 40 hp. is used.

Hydraulic operation is pro-



vided for the table traverse, and the wheelhead has both quick hydraulic in and out movement and fine hydraulic feed. The machine will grind tapers up to an included angle of 9 deg., and is designed for high-production work on comparatively small parts. The drive is self-contained.

The automatic feed to the grinding wheel is of the dual type, operating by hydraulic ratchet and pawl mechanism, with trip motion and dead stops when the table traverse is in operation. When grinding by the infeed method with stationary table, the feed is operated hydraulically. The work table swivels to a scale, the workhead being of dead center type. If desired, drive by constant-speed motor may be obtained.

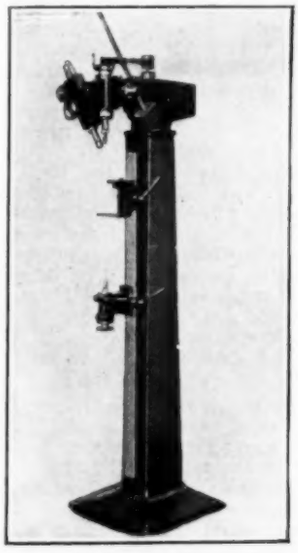
Floor space required, 10 ft. 9 in. by 7 ft. 6 inches.

— 35 —

Grinding Machine, Internal, Center

Selson Engineering Co., Ltd., Charles St., London, E.C., England. [Vol.68,p.228E]

For grinding centers in work preparatory to the main grinding operations, this machine is man-



ufactured by C. Unger, Stuttgart, Germany. An electric motor mounted at the top drives direct to the spindle by belt. The machine is intended to serve as an auxiliary for rapidly truing up the centers in pieces that have become scaled through hardening, and correct any minor variations in the length of the work. The work is held vertically.

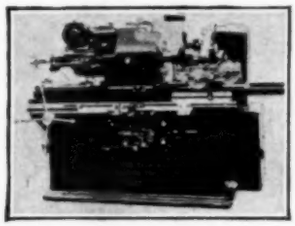
The spindle carries a grinding pin exactly similar in shape to the male center and made of carborundrum of 5/16 in. in diam. Centers can be ground to an included angle of 60 deg. The spindle speed is 5,000 rev. per minute.

— 36 —

Grinding Machine, Internal, with Automatic Sizing Device

Churchill Machine Tool Co., Ltd., Manchester, England. [Vol.69,p.108E].

An improved form of "Intermatic" grinding machine having a motor mounted directly on the workhead has been placed on the market. The machine also has hydraulic movement to the diamond wheel dresser. Further, it has a traversing table, which



carries the work headstock, the grinding wheel spindle being mounted on a heavy stationary cross-slide, which has automatic cross-feed. The movement of the worktable is obtained by hydraulic means, including quick withdrawal of the work.

The automatic sizing device is entirely mechanical, and, it is stated, the machine is fitted to deal with small numbers of parts just as efficiently as with work in quantities. The feed of the cross-slide for the grinding wheel is by a cam, which withdraws the wheel for truing purposes. Independent feed is available, with coarse adjustment for quick positioning of the wheel and fine adjustment to compensate for wheel reduction.

The workhead is placed on a double swivel base, the upper part giving coarse adjustment up to 30 deg. included angle, while the lower part gives sensitive adjustment for grinding parallel or exact tapers. The work spindle has four speeds. Provision is made for water supply to the work both externally and through the spindle.

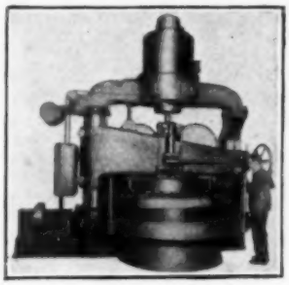
The machine normally has a maximum hole capital of 6 in. in diam. by 11 in. long; the maximum swing inside the water guard is 14 in. in diam., or over the table with the guard removed, 19 in; the hole through the spindle is $1\frac{1}{16}$ inches.

— 37 —

Grinder, Surface, Rotary Table, 6-Foot

Lumsden Machine Co., Ltd., Gateshead, England. [Vol.69, p.63E.]

The maximum depth admitted between the table and the 3 ft. abrasive wheel is 3 ft. on the 6-ft. rotary table, vertical-spin-



dle surface grinder. The segmental grinding wheel is mounted on a flanged spindle, which runs in roller bearings.

A power elevating motion advances or withdraws the wheel arm quickly. Both hand and automatic feeds are provided to the cylindrical ram. The 60-hp. driving motor is of the vertical-spindle type, and runs at 500 r.p.m. The grinding wheel is driven through a splined shaft. The rotary table is driven by a separate motor.

Two speeds are provided by the gearbox, which is actuated by a friction clutch, giving table speeds of 4 and $6\frac{1}{2}$ r.p.m. The grinding wheel is provided with water by a centrifugal pump arranged at the rear.

Weight, 17 tons.

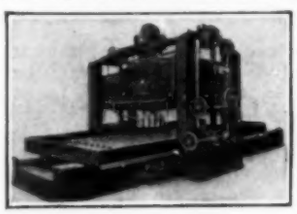
— 38 —

Grinder, Surface, Large

John Lund, Keighley, England. [Vol.69,p.148E]

This large size surface grinder will grind flat surfaces by a combination of the longitudinal traverse of the work and the cross traverse of the grinding wheel. The driving motor is of 40 hp., and is employed for the grinding wheel, which is of the segmental type with an outer steel ring. A separate motor of $7\frac{1}{2}$ hp. is employed for traversing the table. The three changes of traverse available by the gearbox are 10 ft. 6 in., 13 ft. 6 in., and 19 ft. per minute.

The cross traverse of the grinding wheel head is controlled



electrically, either automatically or by hand.

The wheel spindle driving motor is mounted at the top of the wheelhead, and is coupled direct by an internal gear drive. A fine vertical adjustment of the wheel spindle is operated through worm and wormwheel. The spindle is allowed to float and has compensating counterbalance arrangements. The cut is put on against the weight of the counterbalance so that, as the wheel enters or leaves the surface of the work, there is no tendency to take off the corner. The table has a working capacity of 84 in. wide by 30 in. high by 168 in. long.

— 39 —

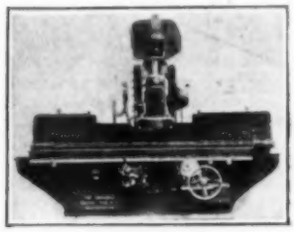
Grinder, Surface, Traversing-Table, Vertical-Spindle

Churchill Machine Tool Co., Ltd., Broadheath, England. [Vol. 69,p.149E]

The capacity of this machine is indicated by the fact that it is used to grind its own table which has a working surface of 72x16½ in. The worktable is reciprocated hydraulically, and the automatic down-feed given to the wheel is also hydraulically operated.

The drive to the machine is by constant-speed motor. The wheelhead is counterbalanced, and is mounted on the column.

As to the spindle, besides be-



ing carried in the wheelhead itself, it is also supported at the top end in the driving bracket on the column. The spindle can slide freely through the driving sleeve.

In addition to the hydraulic down-feed, fine and quick hand motions can be given to the grinding wheel. The hydraulic operation of the table is controlled by a valve on the front and any traverse up to the maximum can be obtained by adjustable dogs. The water for wet grinding is supplied from a tank at the rear.

This machine carries an 18-in. grinding wheel of the ring, cup, segmental or continuous type, and the height admitted under a new wheel is 15 inches.

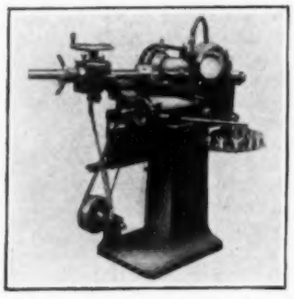
Floor space occupied, with full stroke of table, 17 ft. 6 in. by 8 ft.; weight, 11,900 lb. net.

— 40 —

Grinding Machines, Twist Drill, Point Sharpening and Thinning

Herbert Hunt & Sons, Old Trafford, Manchester, England. [Vol.69,p.61E]

The three types of twist drill point-sharpening and point-thinning machines are: A standard



machine for grinding two-lipped drills; a universal machine for grinding two-, three-, and four-lipped drills, and an automatic machine for the same and having an entirely automatic drive. The machines have also been built in three sizes: No. 1 for drills $\frac{1}{16}$ to $\frac{9}{16}$ in. in diam.; No. 2 for drills $\frac{1}{4}$ to 2 in. in diam., and No. 3 for drills $\frac{1}{2}$ to 3 in. in diameter.

The drill to be ground is held by its shank in a self-centering chuck. Its point is supported in a bushing. During the grinding operation, the drill revolves in a bushing, and by means of a combined swiveling and reciprocating motion imparted to it, the requisite clearance is given to the cutting edge. The amount of clearance can be varied. Sufficient adjustment is provided to accommodate all included angles from 90 to 180 degrees.

The thinning of the drill point is accomplished by bringing the drill over into the correct position relatively to the thinning wheel, lying alongside the main grinding wheel. The drill need not be reset. The depth of the point-thinning cut is adjustable by means of a swivel movement of the thinning wheel.

A centrifugal pump supplies coolant to the drill point. Roller bearings are fitted to the main grinding wheel spindle and ball bearings to the spindle of the thinning wheel.

— 41 —

Grinder, Tool, Oilstone

J. Holroyd & Co., Ltd., Milnrow, England. [Vol.69,p.72E]

For use in pattern shops and in all woodworking departments where a variety of woodcutting tools are used, this oilstone grinder is available. The spindles permit accessibility to any or all

of the wheels, and two or three operators may sharpen tools at the same time.

The machine has two oilstones, an ordinary emery wheel, and a grinding cone, while a leather wheel is provided for stropping purposes. All wheels are revolved at the same time from one source, which may be either a motor or an overhead countershaft.

By the use of various clamps and fixtures, it is possible to sharpen chisels and gouges, trimmer knives, plane irons, and planing machine cutters. The oilstones, set side by side, are of different grain; one for rough grinding and the other for fine grinding. They run in an oil bath, and the swiveling toolrest in front of them can be set to grind tools at any angle. The spindles run in ball bearings.

Floor space occupied is 2 ft. 8 in. by 2 ft. 6 in.; weight, 400 pounds.

— 42 —

Grinder, Tool and Cutter, Universal

Alfred Herbert, Ltd., Coventry, England. [Vol.69,p.88E]

This cutter and tool grinder with the various accessories available will do almost any form of circular and surface grinding. It is suitable for sharpening saws, grinding form tools, and regrinding worn milling cutters. The special feature, which provides the universal characteristics, is a combination of quick and slow movements to the two cross ad-

justments of the table; thus it may be used for traversing the work across the wheel at a quick feed or for adding the cut with a fine feed. The machine will use grinding wheels of any form.

Two tables are available, both being slotted. The upper table travels on the lower, and it may be removed. A tooth rest is carried in a universal holder, either on the table or grinding-wheel head. It may also be carried on the swiveling workhead and on the universal attachment.

Other attachments available include a hand rest, a universal attachment for cutters up to 16 in. in diam., a universal swivel vise, circular grinding and indexing attachments, a grinding attachment for saws up to 36 in. in diam., and an attachment for hobs with spiral flutes. For circular grinding, two additional countershafts are carried on an arm extension of the pillar.

Dimensions: The largest diameter admitted in the centers using the swivel head and tailstock is 10 in., or using the universal attachment, 16 in.; the greatest distance between centers is 27 in.; longitudinal traverse, 32 in.; transverse adjustment, $7\frac{1}{2}$ in.; vertical adjustment, 15 inches.

Power furnished by a 3-hp. motor, floor space occupied, 9 ft. 3 in. by 5 ft. 3 in.; weight, with all attachments, 2,650 lb. net.

— 43 —

Grinder, Tool, Wet, Single, 20-Inch

B. R. Rowland & Co., Ltd., Reddish, England. [Vol.69,p. 107E]

The 20-in. electrically-driven, single wet tool grinding machine is illustrated. Machines of similar type are available, carrying wheels from 14 in. in diam. by 2 in. wide up to 24 in. in

diam. by 3 in. wide and, in a somewhat modified form, up to 36 in. in diam. by 4 in. wide. The front of the machine is formed into a tray to carry an adjustable tool-grinding rest. Lubrication is by means of oil rings, a combined oil filler, sight gage and drain being placed at the rear of each bearing housing.

The water supply is by the firm's system of submersible floats, controlled by a handwheel and worm gear. Depression of the floats into the water raises the level. The system affords fine control. The upper part of the wheel is surrounded by a steel safety guard of an approved type.

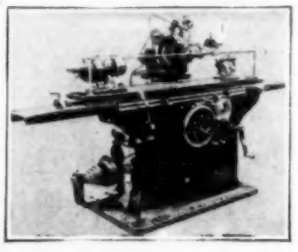
— 44 —

Grinder, Tool and Cutter, Universal

Jones & Shipman, Ltd., Leicester, England. [Vol.69,p. 134E]

This 36x12-in., universal tool and cutter grinder has a height of centers of 6 in., with a distance between them of 37 in. With high centers it swings 16 in. in diam. by 48 in. The longitudinal traverse of the machine is 37 in., and the cross traverse 9 in. The wheelhead table has a working surface of 22x8 in., the vertical movement of the wheelhead being 7 in., while the table has a working surface of $57\frac{1}{2}$x6 in., with positive taper adjustment up to 14 degrees.

The three wheel speeds range



from 1,500 to 3,860 r.p.m., the 12 spindle speeds for the internal grinding attachment being from 3,080 to 33,000 r.p.m. The weight work speeds for external work are from 72 to 275 r.p.m., and the eight work speeds for internal work are from 72 to 440 r.p.m. Special attention has been given to lubricating the different parts.

The wheelhead table swivels on the cross-slide through the full circle, and is graduated all around. The spindle of the internal grinding attachment is held in an adjustable bracket bolted to a fixture on the wheelhead table. The hand cross-traverse gives positive movement to 0.0002 inch.

The wheels used are 10 by 1 in., and 8 by $\frac{3}{4}$ in., and the internal grinding spindles available are suitable for holes from $\frac{1}{4}$ in. in diam. by 2 in. deep up to 5 in. in diam. by 5 in. deep. The machine requires 4 horsepower.

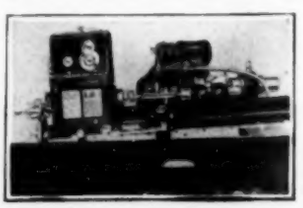
Floor space, 11 ft. 6 in. by 4 ft. 4 in.; weight, 4,220 lb. net.

— 45 —

Grinder, Thread

Dowding's Machine Tool Co., Ltd., Vauxhall, London, S.E. England. [Vol.69,p.13E]

This thread grinder is manufactured by Herbert Lindner, Berlin, Germany. It has capacity for threads up to 5 in. maximum diam. and up to a maximum lead of $4\frac{1}{2}$ threads per inch. The maximum length of



thread that can be ground is $12\frac{1}{2}$ in., and the maximum length that can be held between centers

is 27½ in. A multiple-groove wheel is used.

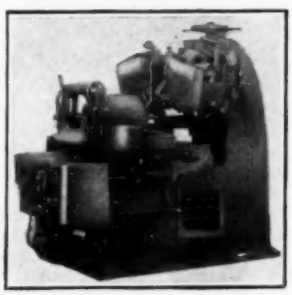
Taps produced on this machine can be finished with a slight relief. On ⅜-in. taps, the accuracy in the effective diam. is plus or minus 0.0004 in., on the thread angle, plus or minus 10 min., and in the lead, 0.0002 in. for every inch of length. A 3-hp. motor is required.

— 46 —

Grinder, Gear, Maag

Crossley & Co., Manchester, England. [Vol.69,p.91E]

Dividing on this machine is now effected mechanically, not electrically. It is actuated by a shaft extending from the gearbox and also operated by a handwheel. This shaft transmits motion to change wheels and a Geneva stop device and thence to an accurate dividing mechanism, which gives the final location for each tooth. The ob-



ject of this mechanical system is to reduce the size and weight of all rotating parts, and the output, it is claimed, has been multiplied by four.

At the front of the machine is a small gearbox. Here are carried the change wheels for roughing and finishing, which actions are controlled automatically. The gear may be completely roughed for all but one to three teeth. When the trip operates automatically it disengages the feed. This allows the wheels to be trued up preparatory to the finishing operation.

As in previous machines, saucer-shaped grinding disks grind the right- and left-hand profiles simultaneously.

The disks can be set for any pitch or tooth thickness by moving the supports together or apart as may be required. The machine grinds up to a diameter of 8½ in. and face widths up to 6½ inches.

— 47 —

Grinding Machine, Band, "Elite"

Wearden & Guylee, Ltd., Bradford, England. [Vol.68,p.291E]

The "Elite" band grinding machines manufactured by R. Cronauer, Frankfort, Germany, have been introduced in England by the above firm. They are available both in horizontal and vertical types. Each type is manufactured in two sizes, the working width of the table being 6 in. The smaller ma-

chine has the band rollers at 16-in. centers, the working length of the table being 13½ in., while the larger machine has 24-in. centers by 22 in. length of working table. The band in each machine is tensioned by the use of a screw. It is possible to employ a spliced band.

— 48 —

Grinder, Snagging, Dry, Double, Motor-Driven

B. R. Rowland & Co., Ltd., Reddish, England. [Vol.69,p.147E]

The machine illustrated is a 24-in., motor-driven dry grinding model. Machines of this type are made in several sizes carrying wheels from 14 by 2 in. up to 30 by 4 in. They may be driven either by a.c. or d.c.

motors, which are totally-inclosed.

Hoffmann bearings are used to the total of four on the shaft, three being roller bearings and one a combined journal and thrust bearing. The wheels are mounted on dovetailed safety plates of steel. Large steel safety guards meet the latest requirements of the Home Office.

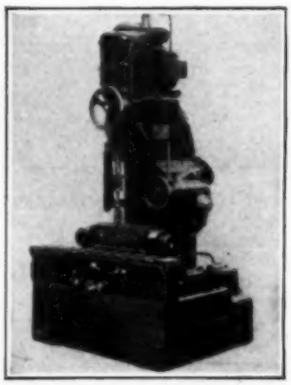
— 49 —

Honing Machine, Single-Spindle

W. Asquith, Ltd., Halifax, England. [Vol.69,p.189E]

This motor-driven machine is used for the finish-honing of automobile cylinder blocks. It may, however, be used for roughing and finishing. The box section base forms a sump for the lubricant. Drive is by a 5-hp., vertical-type, motor at the rear.

The honing spindle receives combined rotary and reciprocating movements. The rotary mo-



tion is at 300 r.p.m., and is obtained direct from the motor by spur gearing. The reciprocating motion, obtained through epicyclic gearing and a connecting rod, may be varied by change gears, two rates of motion being supplied as standard. It may be from 30 to 120 double strokes per min. The stroke is varied by means of a screw in the crank disk up to the maximum of 5½ in. and the position of the stroke may be altered while the machine is running. The spindle adjustment, independent of the stroke, is 9 inches.

Floor space, 4 ft. by 5 ft.; height, 7 ft.; weight, 4 tons.

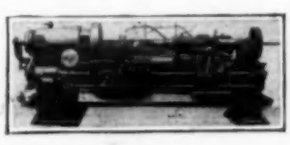
Lathes

— 50 —

Lathe, Engine, Turning, Boring and Cutting-Off

A. C. Wickman, Ltd., Coventry, England. [Vol.68,p.227E]

This lathe is manufactured by Schaerer & Co., Karlsruhe, Germany. It has a height of centers of 10½ in., and will take work 13½ in. in diam. over the saddle. Lengths of 33½ in. can be admitted when the tailstock spindle is driven by a separate electric motor, or 39⅜ in. when a fixed spindle is used. The machine with revolving tail stock spindle is equipped with three independent toolholders, one each for turning, boring, and cutting-off. The normal



maximum length of bore is about 17 inches.

Eight longitudinal and cross feeds are provided, and eight feeds for the fixed type of boring spindle or sixteen for the rotating spindle. The main motor is of 8 hp., running at 1,000 r.p.m., and the supplementary motor for the boring spindle is of 2½ hp., running at 1,500 r.p.m. The main motor drives by belt.

The tailstock is arranged to act as a boring slide. Feeds may be by hand or automatic, and, with the motor-driven spindle, each longitudinal and cross feed has two boring feeds.

Weight, with rotating boring spindle, 8,500 pounds.

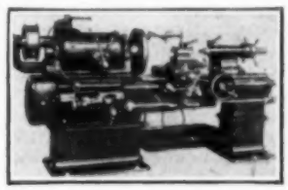
— 51 —

Lathe, Engine, All-Geared, 8½-Inch

G. Swift & Sons, Ltd., Halifax, England. [Vol.68,p.251E]

This lathe permits work 2 ft. 6 in. long between centers and 12½ in. in diam. over the saddle. For screw-cutting, the lathe has a quick-withdrawal motion to the cutting tool. A quick-change magazine gearbox has been incorporated, and the drop worm device for engaging the feeds has been simplified.

The eight spindle speeds range from 23 to 308 r.p.m. Four of



the speeds are by sliding gears and the remainder by double-claw clutch. The drive is by a single flange pulley.

The steel spindle has a 2-in. hole for bar work, and the tailstock sets over for taper turning. Micrometer adjustment is fitted to the surface and cross traverse screws. The magazine screw-cutting gearbox enables 40 different pitches to be cut. They range from 2 to 28 thrds. per in. The 20 feeds vary from 24 to 84 cuts per in. Reversing motion for the screw-cutting, sliding and surfacing is contained in the gearbox.

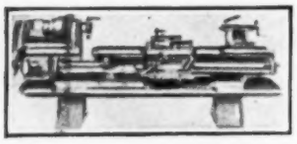
Motor required, 6 hp.; machine weight, 2½ tons.

— 52 —

Lathe, Engine, Gap, 7½-Inch

Colchester Lathe Co., Colchester, England. [Vol.69,p.79E]

Like other lathes made by this firm, this one has a ground bed and ground slides. It admits work 3 ft. 2 in. between centers and 15 in. in diam. over the bed



and 10½ in. over the saddle, admitting work 26 in. diam. by 7 in. wide in the gap. The spindle is bored 2 7/16 in. in diam. to admit a 2-in. rough bar. It runs in bearings of phosphor bronze.

The gears are machine cut and guarded, all pinions and reversing wheels being of steel. The slide rest is indexed and swivels to any angle. The saddle is of sufficient length crosswise to enable work of the largest diameter admitted in the gap to be faced at one setting of the tool. Quick-change gearbox gives 32 different thread pitches for screw-cutting from 4 to 60 per in. and 32 feeds ranging from 8 to 120 cuts per in. The saddle motions are interlocked. The lathe is driven by a two-speed countershaft.

Weight, with 7-ft. bed, 2,700 lb. net.

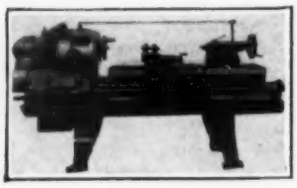
— 53 —

Lathe, Engine, Manufacturing, 7½-Inch

Drummond Bros., Ltd., Guildford, England. [Vol.69,p.86E]

Designed for rapid production, this machine has a wide angular slide to support the saddle and apron. The leadscrew, feed shaft, and traverse rack are placed between the top and bottom rails of this angular slide, and the design allows the saddle to be moved past the tailstock so that short work can be turned readily between centers without undue extension of the tailstock barrel.

The machine swings work 11¾ in. over the saddle and admits 3 ft. 6 in. between centers. The headstock is of the all-geared type with the spindle mounted in



Timken roller bearings. A pump provides oil for all working parts of the headstock.

The all-geared head gives nine speeds in geometric progression from 12 to 300 r.p.m. The sliding and surfacing feeds are obtained through a dropping-worm box, all motions being interlocked. In addition to a thread-catching dial, a quick-change gearbox is provided, giving 24 threads and feeds without loose gears. In addition, a quadrant enables threads of special pitches to be cut by using change gears.

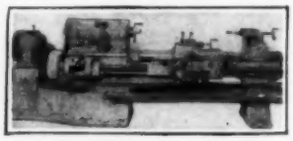
Power required, from 3 to 4 hp.; weight, 3,000 lb. net.

— 54 —

Lathe, Engine, Center, All-Geared Head, 8½-Inch

Colchester Lathe Co., Hythe, Colchester, England. [Vol.69, p.147E]

This improved 8½-in., all-geared-head lathe is driven by a 5-hp. motor, which is mounted on an extension of the bed and coupled by means of a Coventry chain coupling. The bed of the machine is 14 in. wide by 10 in. deep by 8 ft. long. It admits 4 ft. between centers, the swing over the saddle being 13 in. in diam., while 26 in. diam. by 8 in.



can be admitted in the gap for which a half-gap piece is available. The headstock is totally-inclosed and provides eight spindle speeds in geometric progression from 18 to 250 r.p.m. All the other spindles run on ball bearings. The hole through the spindle is bored 2 7/16 in. in diameter.

Reversing mechanism at the rear of the headstock can be operated without stopping the lathe. The slide rest is indexed and can be swiveled as required. The quick-change gearbox gives 32 pitches for screw-cutting and 32 feeds. Adjustment of the tailstock can be made for taper-turning.

— 55 —

Lathe, Engine, Motor-Driven, 51-Inch

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.69,p. 176E]

The bed of this 51-in. center, all-geared lathe shown is 45 ft. long and it takes 30 ft. between centers. The machine is one of the standard lines of the firm. The steel spindle in the headstock is mounted in bronze bearings, and has a heavy ball thrust bearing. The four-jaw chuck carries an external gear driven direct from the headstock.

Four saddles are provided, two each on the front and back ways. All four rests have self-acting sliding feeds, which can

be reversed independently. Of the two front saddles, the right-hand one is arranged for thread-cutting by means of a guide screw. Sliding feeds are obtained from the headstock through change-speed gearboxes, separate boxes being provided for the front and rear saddles. Feed change gears are also provided on each saddle.

Both front rests are arranged for coning. Quick power traverse for the saddles is obtained by means of a 10-hp. constant-speed motor. The loose headstock has a large steel cylinder, adjusted by screw and handwheel, with worm reduction gear for fine adjustment.

Weight, including electrical equipment, 112,800 lb. net.

— 56 —

Lathe, Engine, All-Geared, 13-Inch

C. Redman & Sons, Ltd., Halifax, England. [Vol.69,p. 224E]

This 13-in. center, motor-driven lathe admits work 7 ft. 10 in. long between centers and swings 19½ in. in diam. over the saddle. Work 45 in. in diam. by 18½ in. wide can be machined in the gap or up to 50 in. in diam. if the leading screw is removed. The hole through the spindle is 4 in. in diam. for bar work. Twelve changes in spindle speeds are available from 6.7 to 174 r.p.m. The starting and stopping mechanism is actuated by two hand levers.

The drive is direct from a 10-hp., constant-speed motor. The

power feeds are obtained by eccentric gearing operated by lever. Micrometer adjustment is fitted to the surface screw, and the cross slide and screw are completely protected from turnings. A quick-change gear box gives 40 different pitches of thread without altering the change wheels. The feeds can be varied readily from 4, 8 and 16 cuts per in. to 24, 48 and 96 cuts per inch.

Floor space occupied, 17 ft. by 5 ft.; weight, 4½ tons.

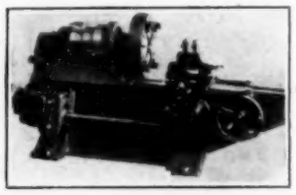
— 57 —

Lathe, Chucking, 24-Inch Swing

Scott Bros. (Halifax), Ltd., Halifax, England. [Vol.69,p. 212E]

The height of centers is 12½ in., and work up to 21 in. wide can be admitted between the chuck and the saddle. The box-section bed is 7 ft. 3 in. long, and the headstock has nine spindle speeds in geometric progression, three being direct by belt and six through two sets of back gears. The spindle has a 2¾ in. hole right through for bar work. It revolves in adjustable bearings, the end thrust being taken on a ball thrust bearing in the rear.

Three surfacing and boring feeds are provided by box, the



surfacing and boring feeds being changed in the apron, an interlocking motion preventing both being engaged together.

Floor space occupied, 7 ft. 10 in. by 3 ft. 9 in.; weight, 2¼ tons.

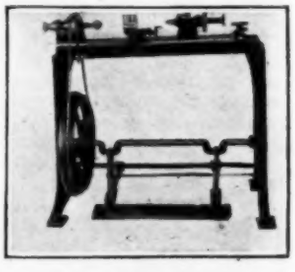
— 58 —

Lathe, Precision, Plain

Henry Milnes, Brownroyd, Bradford, England. [Vol.69,p. 27E]

This plain precision lathe is supplied for the maintenance of fine instruments. It is of 3½ in. centers, and has a straight bed 3 ft. 6 in. long mounted on standards. The bed is undercut for clamping the tailstock and handrest. The headstock has a spindle with reversed cone necks. It is bored through to pass ¼-in. bars, the center end being bored to take split collets. The spindle nose has a plain portion 1⅜ in. in diam., with the threaded portion 1¼ in. in diam., 8 threads per inch.

The speed cone, which is grooved for a round or V belt as required, carries a gunmetal division plate, which is used in conjunction with a micrometer spring stop. The tailstock is clamped to the bed by an eccentric lever device, and has a spindle of the external thread type. The compound slide-rest



is provided with eccentric levers for clamping to the bed, has graduations and also an index pointer for taper turning. The crankshaft is mounted in self-aligning ball bearings. The driving wheel has four high speeds, and an additional small step is provided for slow-speed work.

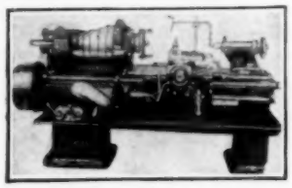
— 59 —

Lathe, Toolroom, Center, 8½-Inch

J. Lang & Sons, Ltd., Johnstone, England. [Vol.69,p.84E]

This toolroom lathe admits work 2 ft. in length between centers on a bed 6 ft. long and swings 9 in. in diam. clear of the saddle. It will cut threads from 1¼ to 80 per in. as well as metric pitch threads and threads for wormwheels. The feeds are from 4¼ to 240 cuts per inch.

The headstock, with gearing at the front, has large and small gear reductions, and with



a two-speed counter-motion, twelve spindle speeds in each direction are obtained. The hole through the spindle is 2¾ in. in diam. The compound slide rest has a swivel arrangement for conical turning.

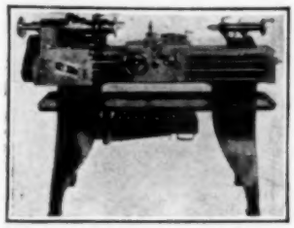
The centralized-control apron provides for the engagement or disengagement of the self-acting sliding and surfacing motions by means of separate drop-out worms. The universal gearbox provides for the cutting of metric and inch pitches without the use of loose change wheels. A swing frame at the end of the box enables special threads to be cut by the provision of suitable change wheels. The tailstock is claimed to combine the advantages of one having side adjustment for taper turning with one bolted solid to the bed for heavy cutting on account of its special design.

— 60 —

Lathe, Precision, 9-Inch

Holbrook & Sons, Stratford, E., England. [Vol.69,p.89E]

This precision lathe has a 9-in. swing over the bed or 5¼ in. over the carriage, the maximum distance between centers being 28 in. The drive is by a cone



pulley and gearing. Twelve spindle speeds range from 11 to 858 r.p.m. End thrust is taken by ball bearings, the hole through the spindle being 1¼ in. in diameter.

A quick-change gearbox gives 27 direct changes, cutting threads from 12 to 80 per in. The sliding and surfacing feeds obtained direct from the box range from 60 to 400 cuts per in., and the metric and B.A. threads are cut by using translating gears on the quadrant.

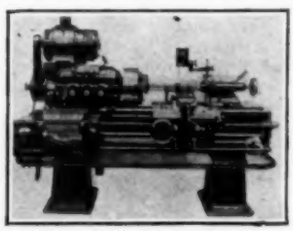
The top slide has quick withdrawal for screw-cutting and recessing, and carries an elevating toolholder, the toolpost capacity being ⅞x⅞ in. The various attachments include taper-turning, relieving, speed-reducing, thread-milling, and grinding.

— 61 —

Lathe, Toolroom, 15-Inch

Holbrook & Sons, Stratford, E., England. [Vol.69,p.101E]

This 15-in. swing toolroom lathe is driven by a 3-hp. motor and chain. It takes work 30 in. between centers, the swing over the saddle being 12¾ in., and the all-geared head gives 12 spindle speeds in geometric progression. The quick-change gearbox gives threads ranging



from 1¼ to 80 per in. Metric and B.A. threads may be cut by using translating gears.

The speed reducer available greatly extends the capabilities of the lathe and of the relieving attachment. The speed reducer gives a reduction of 6 to 1. The relieving attachment in effect converts the toolroom lathe to a relieving lathe. The drive is through a differential gearbox to the six-splined shaft by means of change gears.

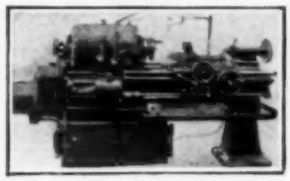
— 62 —

Lathe, Toolroom, Flanged-Motor Type

Dean, Smith & Grace, Ltd., Keighley, England. [Vol.69,p.106E]

A flange-motor drive has been placed on the toolroom lathe manufactured by the above company. The motor is carried below the headstock, and all electrical control gear is completely inclosed in the machine. The 3-hp. motor is of the reversing type and drives through a helical pinion.

The headstock gears provide 12 speeds ranging from 8 to 371



r.p.m. All shafts run on ball bearings, a ball thrust being fitted to the spindle. The latter has a 2-in. through hole. The quick-change gearbox provides 40 changes for thread-cutting and 20 sliding feeds. In addition, a quadrant provides for introducing gears for special threads. The gears run in an oil bath. All feeds are reversible.

A relieving attachment is combined with the taper-turning attachment. The swivel rest is arranged so that a swiveling toolholder, square turret, single toolholder, or a special toolholder may be interchanged easily. On a 6-ft. bed, the machine admits 2 ft. 4¼ in. between centers, while the swing over the shears is 14¼ inches.

Weight, including motor and control gear, 3,900 lb. net.

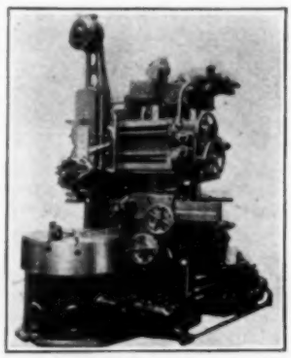
—63 —

Lathe, Turret, Vertical, 36-Inch

Webster & Bennett, Ltd., Coventry, England. [Vol.69,p.59E]

The revolving pentagon turret on the elevating cross-slide and the revolving square turret on a steel ram at the right-hand side of the machine are the features of this 36-in. vertical turret lathe. The slide is carried and guided so that the tool is supported close up to the cutting edge, thus reducing the overhang.

The vertical and horizontal feeds are positive, reversible and



interlocking. The feeds of the main and side turrets are independent, separate feed boxes being employed. Safety devices protect all feed gears. Rapid power traverse in all directions is available for quickly moving the main turret over the work. Further, the feeds are interlocked with the rapid power motion. Power elevation is also available for adjusting the position of the cross-slide.

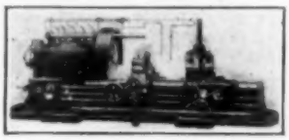
The parts that comprise the dividing mechanism are hardened and ground, while the setting faces locate the turret in its central position over the chuck for boring. Taper boring and turning are effected by means of the graduated swivel slide.

— 64 —

Lathe, Turret, Combination, No. 15

H. W. Ward & Co., Ltd., Birmingham, England. [Vol.69, p.65E]

A single-pulley all-geared headstock is provided on this combination turret lathe, the height of centers being 15 in., the swing over the bed 32 in., and the diameter of the hole in the spindle 8¼ in. Sixteen spindle speeds are provided,



ranging from 6 to 180 r.p.m. The swing over the top of the cross-slide is 21 in. The length of longitudinal automatic feed is 54 in., the number of reversible feeds to the saddle and cross-slide being 10, the feeds ranging from 16 to 347 cuts per in. As regards the turret, the maximum distance between the spindle nose and the turret face is 72 in. Fifteen feeds are provided to the turret saddle, the range varying from 9 to 217 rev. per in. of traverse. All gears used are heat-treated and hardened.

The headstock is driven direct from the main shaft, the pulley running on ball bearings mounted on a stationary shaft. Eighteen spindle speeds are provided in the reverse direction. The saddle has automatic sliding and surfacing motions actuated by one lever.

The cross-slide carries a forged steel square turret of 8 in. side in the front and a toolpost at the rear. The turret indexes in four positions. The chasing motion is applied to the saddle.

The turret is hexagonal in form, each face being 11 by 8¼ in. It can be rotated by hand or automatically. For indexing, a cylindrical bolt engages with hardened and ground steel cone bushings. The stops for the turret slide are carried on a hexagonal shaft which is driven in synchronism with the turret. The turret saddle can be connected to the chasing saddle so that when producing screw threads from the turret, the pitch can be controlled from the lead screw.

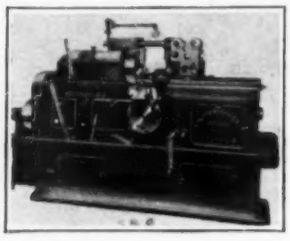
Length, 13 ft. 6 in.; weight, 8¾ tons.

— 65 —

Lathe, Turret, Automatic, Improved

A Butterworth & Co., Rochdale, England. [Vol.69,p.109E]

Two new features are incorporated in this improved, automatic turret lathe. The first is that while cutting the toolholder is supported by two overhead bars, which project from the headstock. With the work center, these bars form a triangle, thus inclosing the thrusts of cutting. The bars are adjustable and project the entire distance, according to the length of the work. The indexing mechanism is now independent of the travel of the slide. Thus



indexing takes place after the slide is returned to its farthest backward position, allowing greater clearance for tools. The turret has a large-diameter cone seating in the slide.

To accommodate the different lengths of work, the headstock is carried in a slide in the bed and may be clamped as near to the tools as the length of the work permits. The drive is by single pulley and gearing, three changes of spindle speed being available. The range can be altered by change wheels. A range of five automatic feed changes may be set to operate on any turret face for most efficient operation.

The cross-slide carries two independent adjustable tool blocks, each having a toolpost. It is operated by an external cam drum at the rear, easily accessible for changing cams. A choice of two feeds is available. A knock-off motion stops the machine at the completion of each piece, or it may be set to operate at any intermediate point.

— 66 —

Lathe, Capstan, with Power Feed

Charles. Taylor (Birmingham), Ltd., Birmingham, England. [Vol.69,p.223E]

This 7-in. center, wire-feed capstan lathe with power feed to the saddle and capstan slide is similar to the standard line manufactured by the above company. It admits work 1¾ in. in diam. through the automatic chuck and 6¾ in. over the saddle, the capstan having a working

stroke of 7½ in. and the saddle a movement of 14 in. along the bed, which is 5 ft. long. The machine illustrated is intended for the production of pins, studs and formed parts.

The capstan is bored for six tools, and is revolved and indexed automatically on the return stroke of the slide. The saddle can be moved along the bed, and the cross-slide is operated by a quick pitch screw and handwheel. The automatic feeds for the saddle and capstan rest are derived from a three-speed box driven from the spindle. The feed to the saddle is arranged to trip automatically by means of four hand-operated stops, while the cross-slide has five adjustable end stops. The capstan slide is tripped automatically by means of six adjustable end stops.

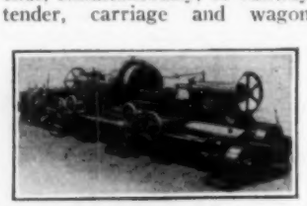
Floor space occupied, 9½ ft. by 2½ ft.; weight, with countershaft, 1,550 lb. net.

— 67 —

Lathe, Axle, Roughing and Finishing, Duplex

Craven Bros. (Manchester), Ltd., Reddish, England. [Vol. 69,p.134E]

Height of centers on this lathe is 15½ in. and the length of the bed is 15 ft. 6 in., to admit 8 ft. 6 in. between centers. The lathe is specially adapted for rough turning and finishing the journals, wheel seats, set-downs and collars at the two ends, simultaneously, of railway tender, carriage and wagon



axles. Multiple tools of circular form are employed for roughing-down purposes and also for finishing the wheel seats. Form tools are used for finishing the journals, collars and set-downs simultaneously. The limit of material removed on any diameter is ½ in. Ten standard 12-ton wagon axles can be finished from the forging in an 8-hour day without taxing the capacity of the machine.

The capacity is 6 cuts, each ¼ in. deep by $\frac{1}{16}$ in. feed at 60 ft. per min., a total of 67½ cu.in. per min. being removed. The drive is by a 35-hp. variable-speed motor through a change-speed gearbox. The driving headstock carries a spindle having a central hole 1 ft. 3 in. in diam. One end of the driving spindle is fitted with the firm's adjustable driver, which grips the axle. The following headstocks are adjustable along the bed.

The carriages have front and back toolrests. Longitudinal self-acting motion is provided. Independent adjustable automatic stopping motion arrests the traverse in one direction at any desired point. Both carriages have quick hand and power adjustment along the bed and can be worked simultaneously or independently as may be desired.

Weight, excluding electrical equipment, 26,000 lb. net.

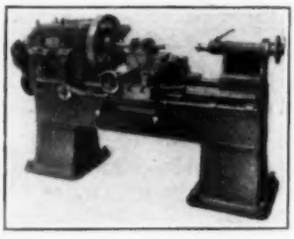
— 68 —

Lathe, Screw-Correction

Bryant Symons & Co., Ltd., St. John St., London, E.C., England. [Vol.69,p.213E]

This screw-correction lathe has a capacity of 8 in. in diam., either internal or external, by 8 in. long internal and 18 in. long external. The maximum pitch error of work produced over the whole length is 0.0004 in., the periodic error not exceeding 0.00015 in. per inch throughout the length.

Four spindle speeds are available from 9½ to 42 r.p.m. For the finer pitches the drive is from the spindle to the lead-



screw. For coarser pitches, a second train of wheels is employed on the end of the bed and the flanged pulley drives first to the leadscrew. In each case, a divided disk enables multi-threads to be cut.

For internal thread-cutting, circular tools are used. Micrometer screws provide adjustment longitudinally and cross, the screw in the latter case adjusting an independent spindle. A magnifying device is provided for observation purposes.

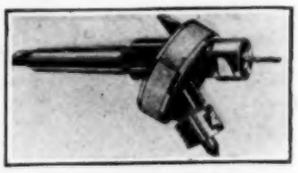
— 69 —

Centering Head, Lathe, Duplex

Wearden & Guylee, Ltd., Bradford, England. [Vol.68,p. 277E]

This duplex centering head is combined with a taper shank for insertion in the lathe tailstock, the drill and countersink being held in separate collets on a head which can be turned and registered into two positions so as to bring either tool into position. A hardened steel pawl in the back insures accurate alignment. The collets are of steel, hardened and tempered, and the tools are secured by means of hardened caps.

The shank mountings are separate, and can be made to suit



the lathe headstock. These appliances can also be employed in turret lathes. They can also be used for follow-up purposes, that is, a drill can be succeeded by a reamer or by a tap, and so on.

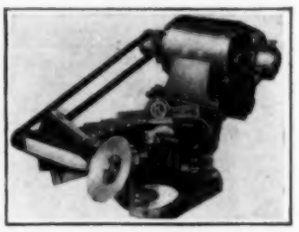
— 70 —

Grinding Attachment, Thread, Universal, for Engine Lathes

Dowding's Machine Tool Company, Ltd., Vauxhall, London, S.E. England. [Vol.69,p. 13E]

This thread grinding attachment, manufactured by Herbert Lindner, Berlin, Germany, is intended for engine lathes, and can be used where the lathe centers are from 6 to 8 in. in height, and also on relieving lathes with 7- to 10-in. centers. Threads of all standard forms can be ground, and also single and multiple Acme threads. The attachment can be used for backing-off purposes on thread milling cutters and hobs. The range of lead is from 28 to 5 threads per inch.

A multiple-groove wheel is used on this machine. It can be produced in 5 min. The wheel is used for rough grinding the work, while a single-profile wheel is used for finish grinding purposes. The largest and smallest wheels that can be used are 4 and 1¾ in. The wheel dresser is arranged horizontally, and is adjusted so that the diamond lies in the horizontal plane of the grinding wheel.



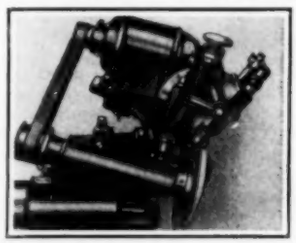
The work may be held between centers or in chucks. The wheel is tilted to the helix angle of the thread, a scale being provided. Drive is by a 3-hp. motor.

— 71 —

Grinding Attachment, Thread, for Engine Lathes

Dowding's Machine Tool Co., Vauxhall, London, S. E., England. [Vol.69,p.13E]

This attachment, manufactured by Herbert Lindner, Berlin, Germany, is intended for use on engine lathes having from 7 to 10 in. height of centers, the range of lead on the screws produced being from 28 to 4½ threads per in. The attachment uses a multiple-groove wheel for roughing, and full-profile teeth



for finishing the threads in cases where the full thread is ground direct from the stock. The multiple-groove wheel is produced in about 5 min. It is used for rough grinding the work, whereas a single-profile wheel is used for finishing, when it is found necessary.

This attachment has ground a tap 1 7/16 in. in diam. with a thread of ⅛ in. lead, 2¾ in. long, in 24 min. A ¼-in. Whitworth plug thread gage was finished within 0.00008 in. Wheels from 4 to 6 in. in diam. are used. The smallest wheel that can be used is 4 in. in diam. The dressing device is attached to the wheelhead, and is out of parallel with the work. The work is held between centers or by chuck. The wheel is tilted to the helix angle of the thread, a scale being provided. Drive is by a 3-hp. motor.

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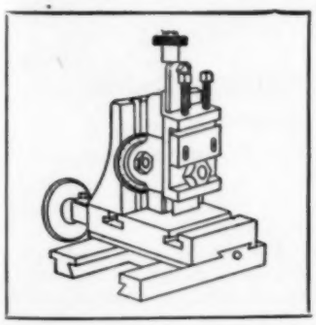
Milling Device for Small Lathes

Henry Milnes, Bradford, England. [Vol.69,p.136E]

This angle bracket and vise attachment, which can be used for milling, is supplied for use



with the 3¾ in. center lathes marketed by the above concern. The milling cutter is carried on an arbor secured to the lathe spindle or on a mandrel running between the lathe centers. The angle bracket is mounted on the boring table of the lathe and has a vertical T-slot to take the bolt of the swivel slide. The toolpost is removed.

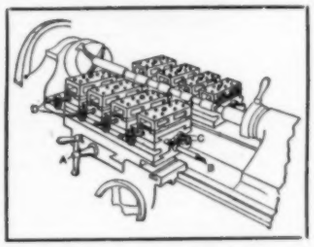
The headstock in this lathe now has a spindle with hardened and ground conical necks running in phosphor-bronze bushes. The spindle is bored through to pass bars ⅝ in. in diameter.

— 73 —

Toolrests for Lathes, Multiple

Edward Togel, Rosenthal, Czechoslovakia. [Vol.69,p.163E]

The above firm has developed multiple toolrests suitable for lathes and planing machines. With these rests a number of toolholders may be mounted so as to have both independent



adjustment longitudinally and transversely, and also adjustment in unison in each direction. The lathe carriage is provided with guides for a cross-slide, which carries the longitudinal slide and can be adjusted by means of a screw.

Should any tool become blunt and need replacement or adjustment, this can be effected easily, independently of the other tools. Similarly, each toolholder can be adjusted individually to any angle, and, if required, the toolrests can be arranged to carry steadies for the work. The tooling system for a given job can be built-up readily, and rearranged as readily to suit other work.

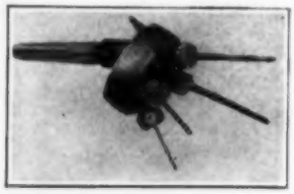
— 74 —

Drilling Head, Lathe, Quadruplex

Wearden & Guylee, Ltd., Ltd., Bradford, England. [Vol. 69,p.164E]

This quadruplex head is similar in design to the two duplex heads described on page 277 E, Vol. 68, of the *American Machinist*. Separate tools are used, each being held in its own collet, and each collet on the head being revolved in turn into the working position, where it is registered by means of a hardened steel thumb piece or trigger.

In use, the head is mounted on a shank in the lathe tailstock. The collets are of hardened and tempered steel and will accommodate tools up to ½ in. in diam. A three-leaf spring maintains the thumb piece in position, while a simple thumb pressure releases the trigger and allows each collet to be rotated.



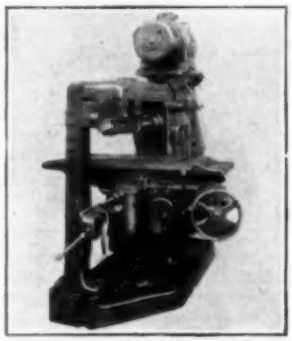
Milling Machines

— 75 —

Milling Machine, Manufacturing, Horizontal, No. 14M

Alfred Herbert, Ltd., Coventry, England. [Vol.69,p.58E]

This No. 14 M manufacturing horizontal miller permits every operation to be controlled from the front of the knee after the spindle speed is set. The table has a working surface of 48x15 in., its automatic longitudinal feed is 30 in., the transverse adjustment is 6 in., and the vertical adjustment from the center of the spindle is 15 in. Eight spindle speeds range in geometric progression from 19.5 to 205 r.p.m. The eight feeds provided range from 1¼ to 11¼ in. per min. The drive may be by belt or electric motor.



One of the features is a patent brace connecting the overhanging arm, the arbor support, the knee, and the base. The brace, being offset, does not affect the accessibility of the work or cutters. It is of the stiff box form and extends from the overhanging arm to the base. The maximum distance from the face of the column to the brace is 27 in., and the distance from the center of the spindle to the arm is 6¼ in. The brace permits cutters up to the full swing of the arm, which is 12 in. in diam., to be removed and replaced without the brace being removed. The box-type overhanging arm can be removed without effecting the arbor support. The spindle has a standardized nose, and is bored through.

The knee is of box form. The automatic longitudinal feed to the table is driven from a pulley. The feed changes are made by slip gears contained in a housing on the front of the feed box. An adjustable safety dog enables work to be moved up to the cutter by the quick power traverse, after which the feed is engaged.

Floor space required 7 ft. 8 in. by 8 ft.; weight 5,200 lb. net.

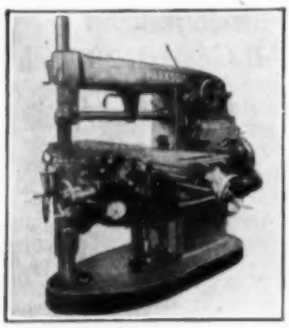
— 76 —

Milling Machine, Horizontal, Plain

J. Parkinson & Son, Shipley, England. [Vol.69,p.64E]

This plain milling machine has table movements of 40 by 12 by 20 in.; 16 spindle speeds ranging from 14 to 340 r.p.m., and 16 feeds from ½ to 14¾ in. per min. to the cross and longitudinal movements of the table. In addition, power traverse is provided at the rate of 25 in. per min. to the cross and vertical movements, and rapid power traverse at 120 in. per min. to the longitudinal movement. The table may be equipped with a trip mechanism, which automatically controls the changes of rate and direction of traverse. Sixteen feeds are provided.

Passing through and fitting in the bosses of the overarm is a vertically sliding bar, which is moved by means of a hand-



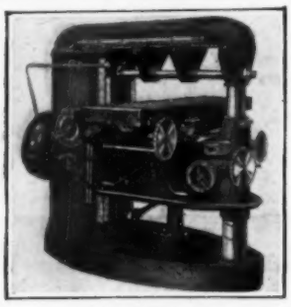
wheel. The lower end of the bar fits over a projection, which extends upwards from the front of the knee bracket.

— 77 —

Milling Machine, Horizontal, "Rigid"

Crossley & Co., Manchester, England. [Vol.69,p.69E]

These milling machines are made by the Rigid Milling Machine Co., Ltd., Rorschach, and



the type illustrated has a table 71 by 20½ in. in area, the feeds being automatic in each direction. The longitudinal feed is 45 in., transverse 14 in., and vertical 20 in. The distance between the column and the pillar is 36 in., and the maximum distance from the center of the arbor to the table is 20 in. The spindle speeds number 16, ranging from 15 to 450 r.p.m., and the 16 feeds range from ¾ to 33½ in. per min. Rapid movement is also provided for the table at the rate of 100 in. per min. longitudinal, and 50 in. per min. for both transverse and vertical movements.

In these machines, the overarm is supported by an outer telescopic column, which extends to the base and unites the overhanging arm, cutter arbor, and the table. The work is always visible and accessible, and the table can be adjusted vertically. The feed can be changed while the machine is running. The quick power traverse of the table in all directions is controlled by a single lever. A central oiling system serves the bearings.

Power required 30 hp.; weight 1,900 lb. net.

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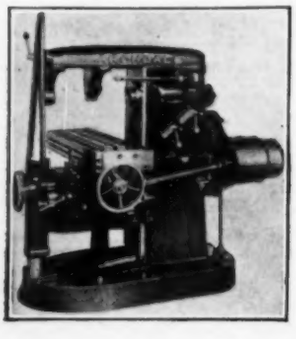
Milling Machine, Horizontal, All-Geared, 28-Inch

J. Archdale & Co., Ltd., Birmingham, England. [Vol.69,p.107E]

On this machine the longitudinal traverse is 28 in., the transverse traverse is 7½ in. and the vertical traverse is 16 in., all automatic. The miller is driven by a 6-hp., built-in, flanged motor, mounted at the rear. The spindle is started and stopped by a high-speed clutch con-



trolled by lever at the front, and the drive is transmitted to the spindle through a six-speed gear box.

A four-change feed box of the selective sliding gear type is mounted on the head. Two pairs of slip gears in conjunction with the four-change feed box, give a total of 16 feeds, ranging from 1 to 12 in. per min. For lubrication, an oil pump is provided in the machine. A special arrangement of trips allows of intermittent cutting and gives rapid traverse over gaps in the work and quick-return motion to the table.

— 79 —

Milling Machine, Vertical

Smith & Coventry, Ltd., Timperley, England. [Vol.69,p.110E]

On this vertical milling machine, the table has a surface 18 in. by 3 ft., longitudinal traverse of 3 ft. and transverse traverse of 18 in. The spindle has eighteen speeds ranging from 20 to 300 r.p.m., and nine feeds. Quick traverse is also provided. The drive has been brought as close as possible to the cutter itself, and a separate adjustment axially has been pro-

vided for the cutter spindle, when the cutter head itself is locked to the upright.

Hand vertical adjustment is provided, and also quick power traverse in both directions. Safety devices prevent overrunning. The spindle is carried in a long sleeve with double cone bearings. It is bored, recessed and tongued for heavy face milling.

The table is actuated by a screw and two shafts inside the bed. One shaft transmits the ordinary feed motions and the other the rapid power traverse. All feed gears in the slides are totally-inclosed.

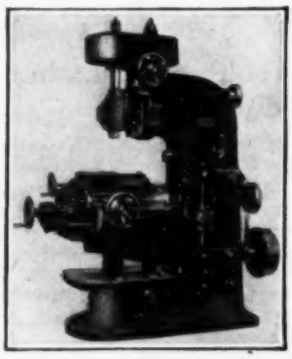
— 80 —

Miller, Diesinking, Universal

W. H. Eveson, 30 Paradise St., Birmingham, England. [Vol. 68,p.226E]

Four standard sizes of this diesinking milling machine are manufactured by Curd Nube, Offenbach, a.M., Germany. The machine has three spindles, two being vertical spindles, one working from the top and swiveling to 20 deg., and the other working from the bottom and being fixed. The horizontal spindle can be omitted if desired. In addition to the ordinary standard table with cross movement, circular and oval tables are available, and these, if desired, may be fitted with automatic rotary motion.

The drive is by single pulley or by flange motor. In the machine illustrated, the standard table is about 37½ in. long by



25 in. wide, and has movements of 20x10 in. The round table is 24½ in. in diam., with movements of 14½x7½ in. The upper spindle has a vertical adjustment of 8½ in., the maximum distance between the center of the spindle and the upright of the machine being 20 in. The top spindle has 16 speeds and the lower vertical and horizontal spindles have 8 speeds, the feeds ranging from 0.03 to 0.27 mm. or 0.10 in. per rev., approximately.

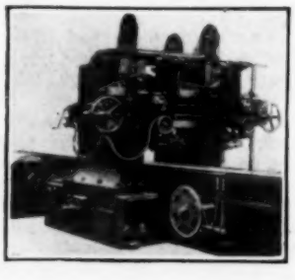
Weight 7,700 lb. net.

— 81 —

Milling Machine, Combined Horizontal and Vertical

J. Hetherington & Sons, Ltd., Manchester, England. [Vol.68, p.206E]

Long strip material can be machined on this miller. The working surface of the table is 41 ft. x 1 ft. 4 in., and the table has a traverse of 40 ft. The width between uprights is 3 ft. The machine has three feeds, 3½, 5, and 6½ in. per min., with power traverse of 10 ft. per min. The machine has two swiveling



vertical spindles and one horizontal spindle. The drive is by a 24-hp. motor, running at 750 r.p.m., through a gearbox giving nine changes of speed.

Each vertical spindle has a flywheel to reduce vibration. Spindle speeds range from 22 to 87 r.p.m. The horizontal spindle has speeds from 20 to 78 r.p.m. All spindles are 1 ft. 10 in. from the table.

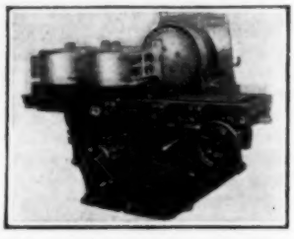
Weight without motor 25½ tons.

— 82 —

Milling Machine, Surface, Special-Purpose

J. Parkinson & Son, Shipley, England [Vol.69,p.29E]

Although obviously not a general-purpose machine, this milling unit will give results which will compare favorably with those of a more expensive machine for certain classes of work. The main frame is in one casting on which fits the



saddle, which supports the table. The saddle is 4 ft. 8 in. long and the spindle has a cross traverse of 6 in. The size of the cutter, the distance from spindle to table, the size of table and length of traverse may be varied to order. The height of both spindle and table are fixed, without vertical adjustment. In the machine illustrated, the spindle height is 10 inches.

Provision is made for altering the speed by pick-off gears. If frequent changes are required, a change-speed gearbox with lever change may be supplied. The final drive to the spindle is by double-helical gears.

Pressing down the table traverse lever gives the slow traverse or the cutting feed and lifting it gives the quick traverse at a constant speed of 100 in. per minute.

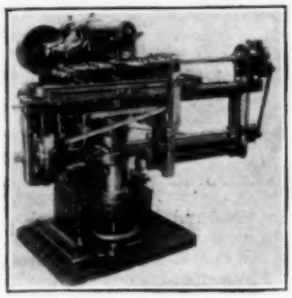
Weight of the machine illustrated, 7,200 lb., net.

— 83 —

Milling Machine, Automatic, for Reamer Flutes

H. Hunt & Sons, Old Trafford, Manchester, England. [Vol.69,p.119E]

For milling flutes and reamers up to 2 in. in diam. and 18 in. in length overall, this ma-



chine has been developed. It will mill them in either straight or spiral flutes of equal or unequal pitch and of equal or unequal depth. Further, it can be employed to flute reamers which are parallel, taper, or part parallel and part taper. It can also be arranged to mill the flutes in twist drills with the depths of the flutes decreasing towards the shank end.

The cutter arbor carries three cutters, and the dividing head has triple centers, so that three pieces can be milled simultaneously. The machine works entirely automatically.

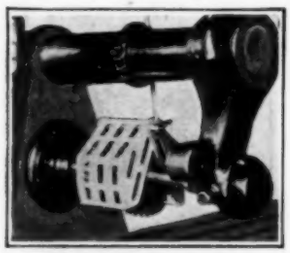
The work is carried between centers on a sliding table. At the end of a cutting traverse, the table falls and lowers the work clear of the cutters. It then returns quickly to the starting position, and after the work has been rotated through the required angle, the table rises again and the next cut is taken. The depth is controlled by means of a cam disk driven from the dividing plate spindle.

— 84 —

Guard, Milling Cutter, Improved

Brayshaw Furnaces & Tools, Ltd., Manchester, England. [Vol.69,p.93E]

This milling cutter guard is designed to meet the latest Factory Act requirements. Compared with the company's earlier forms, the clip round the arm of the milling machine is the same as before, but the protecting cover consists of two jaws which



can be adjusted by a thumb screw. This cover is adjustable vertically like the old form, but the new design protects the leaving side of the cutter as well as the incoming side.

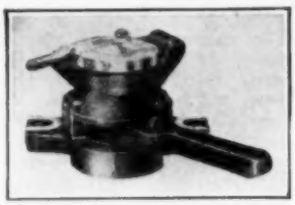
Users of guards of the firm's old type can retain the clip round the milling machine arm, the alteration necessary to bring the guards to the new form being confined to the guard itself. The standard size is suitable for cutters from 2½ to 6 in. in diam. by 4 in. wide.

— 85 —

Indexing Attachment for Milling Machines

John Ackworthie, Ltd., Coleshill St., Birmingham, England. [Vol.69,p.137E]

This attachment is intended to be fixed to the table of a milling of other machine for the purpose of holding work to be slotted or squared or for other operations that necessitate a dividing apparatus. It has a



quick action for tightening and loosening the collet and for indexing. It is self-contained. The apparatus will divide in 2, 3, 4 or 6 parts, and small screwed plugs are provided so that holes not required can be covered. The collet has a ¾ in. clearance hole through it, enabling work up to this size to be held. The same attachment is made in a larger size, taking bars up to 1¼ in. through the collet.

Planers and Shapers

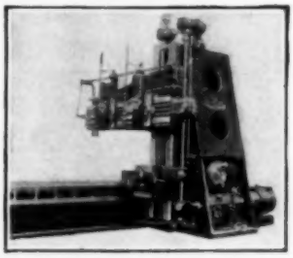
— 86 —

Planer, Openside, Large, "Hiloplane"

J. Stirk & Sons, Ltd., Halifax, England. [Vol.69,p.57E]

This openside "Hiloplane" planer is intended for work up to 16 ft. long by 6 ft. wide. The bed is of the continuous-plate type, and the table is of box bridge design. Table planing is from the main reversing motor and a double-helical reduction gear through a keyless change gear.

Both cross and vertical planing are from a supplementary reversing motor, and either cross-slide head may be used for cross planing and the side head for vertical planing. Electric



rotary reversible quick-change feeds are provided, extra broad feeds being available for finishing cuts. A magnetic tool-lifting device is fitted.

Both quick and fine power traverses are given to all three heads by the supplementary motor, which may be readily coupled to any motion by selector clutches. The elevation of the cross-slide is also accomplished electrically.

Drive is by the Stirk split-field reversing motor equipment suitable for either a.c. or d.c. circuits. The table stroke, and also the horizontal and vertical planing are controlled from one common disk and master switch.

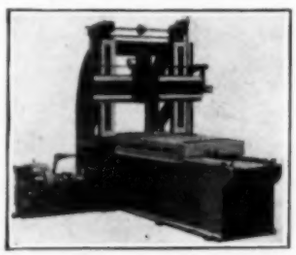
— 87 —

Planer, Crank-Type

White Machine Tool Co., Ltd. Halifax, England. [Vol.68,p.260E]

This crank-type planer is intended for high-speed, short-stroke work ranging from 2 to 36 in. The stroke can be regulated to within ⅛ inch.

The bed is 10 ft. 6 in. long by 2 ft. 6½ in. deep. The box-form worktable has a working surface of 4 ft. 6 in. by 2 ft. 6 in. The cross-slide is stiffened by a deep fish back and cross ribs. The toolbox can plane the full width admitted between the housings, and is 7½ in. wide. It is graduated and swivels through 90 deg. It is supported on ball thrust bearings and has reversible hand and automatic feeds in all directions, and an automatic tool-lifting mechanism for the return stroke. The 11-in. down feed is actuated



through spiral gears, and all feed screws have micrometer dials.

The drive is by means of a 10-hp. constant-speed motor and chain. Power is transmitted through a six-speed gearbox giving from 10 to 30 strokes per min., and through reduction gears to the link wheel. The machine is engaged or disengaged through the medium of a friction clutch. A brake arrests the table automatically when a clutch is out of action.

The return of the table is at double the speed of the forward stroke. Power elevating motion is provided for raising and lowering the cross-slide. The feeds, from $\frac{1}{16}$ to ¾ in., can be varied while the machine is in motion.

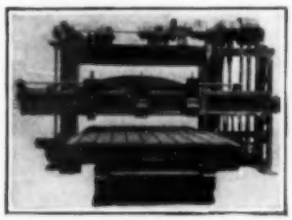
Floor space required 13 ft. 2 in. by 7 ft. 6 in.; weight 4¾ tons.

— 88 —

Planing and Milling Machine, Combined

C. Redman & Sons, Ltd., Halifax, England. [Vol.69,p.162E]

This combined planing and milling machine is specially adapted for planing longitudinal machine frames and for cross-milling. It will plane work up to 14 ft. long by 8 ft. 6 in. wide by 4 ft. high at one



cutting speed only, which is 45 ft. per min., returning at 90 ft. per min. Four tool-boxes are fitted, two on the cross-slide and one on each housing. The main drive is by a 30-hp. constant-speed motor and self-contained countershaft with four-belt drive.

The cross-milling head on the left-hand end of the cross-slide is driven by a separate 10-hp. motor. The cross-slide has power elevating motion. The worm-driven milling-head spindle is carried in a sleeve giving 7 in. of vertical adjustment by hand.

A sensitive hand traverse is arranged for setting the worktable. The bed of the machine is 21 ft. long by 5 ft. wide by 19 in. deep. The working surface of the table is 14 ft. long by 7 ft. 6 in. wide. The two toolboxes on the cross slide are fully universal with automatic feed in any direction, and are graduated to swivel to 140 deg.

Floor space required 31 ft. 3 in. long by 20 ft. wide; total height 11 ft.; weight, without motor, 30 tons.

— 89 —

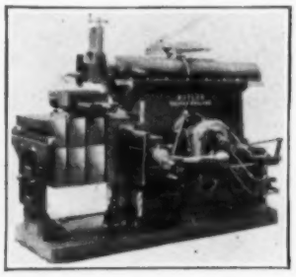
Shaper, Crank, Ball-Bearing, 32-Inch

Butler Machine Tool Co., Ltd., Halifax, England. [Vol.69,p.78E]

The table top measures 30x20 in., and the side is 20x20 in. deep. The horizontal travel on the slides is 30 in. and the verti-

cal travel 15 in. The machine will admit 18 in. on top of the table and the vertical adjustment of the toolbox is 9 in. Quick power adjustment is provided for the table. The drive is by 12-hp. constant-speed motor through a friction clutch and reduction gearing to a gearbox giving eight speeds from 4.5 to 65 cycles per min. The feed mechanism provides ten feeds, from 9 to 90 cuts per inch.

The stroke of the ram may be altered while the machine is in motion, and its position relative to the work may also be varied. The gear changes are



interlocked. The gearbox is of unit construction and all gears are lubricated automatically. Ball bearings are provided for the shaft bearings.

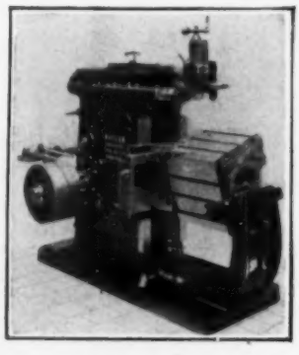
The feeds may be engaged or stopped, or any feed within the complete range may be selected while the machine is in motion. The toolbox is of single-screw type, with a serrated, hardened steel pad. It has a graduated swivel front and thrust faces. The toolbox screw is fitted with micrometer collar and a locking device is provided for the down slide. Self-acting vertical feed to toolbox is provided. The swivel-base vise has steel faced jaws, the width of jaw being 14 in. and the depth 3 in. It opens 15½ inches.

— 90 —

Shaper, Crank, Toolroom, 12-Inch

Butler Machine Tool Co., Ltd., Halifax, England. [Vol. 69,p.135E]

The horizontal travel on the table slides of this shaper is 18 in., and the vertical travel is 12 in. The table will admit on top 16 in., and the vertical adjust-



ment of the toolbox is 5 in. The machine has been specially designed for toolroom work, being fitted with a combined swiveling and tilting table. Six speeds may be obtained, from 11 to 120 cycles per min.

The ram may be stopped in any position. Ball bearings are fitted. Self-acting vertical feed is provided for the table slides and the stroke may be adjusted while the machine is running. For keyseating, the body of the machine has a clear hole under the ram slides to pass shafts up to 2½ in. in diameter.

Weight 1,725 lb. net.

— 91 —

Shaper, Traversing-Head, Double

Graham & Normanton, Halifax, England. [Vol.68,p.277E]

This machine has a nine-speed gear box with brake at each end, and independent quick power traversing motions. It also is equipped with inching devices in the form of hand ratchet motions for the saddles. Work up to 2 ft. 4 in. deep can be admitted between the top of the table and the underside of the ram.

The bed is 16 ft. long by 2 ft. 7 in. across the top by 2 ft. 9 in. deep.

Each head has an independent traverse along the bed of 11 ft., the maximum distance between the cutting tools being 12 ft. 6 in. and the minimum 1 ft. 6 in. Rapid power traverse is obtained by belt from the gear box through friction clutch. Each head is driven independently by a 5-in. belt.

Floor space occupied 21 ft. long by 11 ft. wide; weight 13 tons.

— 92 —

Shaper, Draw-Cut, Traveling-Head, 60-Inch

Butler Machine Tool Co., Ltd., Halifax, England. [Vol.69, p.15E]

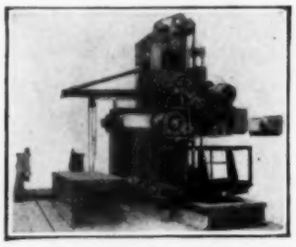
This traveling-head shaper will not only shape on 5 ft. of length in 5 ft. of height by 9 ft. of width, but will also mill bore, and drill within these dimensions. These operations can be performed at the same setting, because of the long reach and rigidity of the steel shaping bar, which is 10 in. sq. The machine can be carried to the job when required, the underside of the crossbed being planed so that it can be secured to any floor plate. Further, the shaping head may be used either for push or draw cuts.

The stationary worktable is 8 ft. by 3 ft. by 2 ft. 6 in. with T-slots on the front and top. The column moves on roller bearings, and the ram headstock is balanced. The shaping bar is of forged steel. The tool head feed is 8 in. A push-cut toolbox is available. Furthermore, a forward toolbox or offset cutter head is provided.

The ram is bored to receive a spindle, and the front is screwed to take a back plate or grip ring for the various toolheads used. The necessary milling cutters are provided.

The main drive is by a 15-hp. reversing motor providing cutting and return speeds between 16 and 60 ft. per min. The feed motions are driven by a separate 3-hp. motor giving in conjunction with a four-speed gearbox, a continuous range of feeds from ½ to 30 in. per min. The small motor also provides quick power traverse for the carriage in both directions on the column and for the column along the bed. The milling and boring motions are obtained from a separate vertical shaft driven from the main motor. The three boring speeds range from 2½ to 140 rev. per minute.

The equipment includes a pair of chucks to hold cylinders ranging in bore from 16 to 36 in. The maximum opening between the chucks is 4 ft. The self-acting boring bar is 7 ft. long with a vertical column adjustment of 5 ft. and horizontal adjustment on the bed of 2 ft. 6 in. A self-acting facing arm



is available as well as the necessary inserted-cutter boring head.

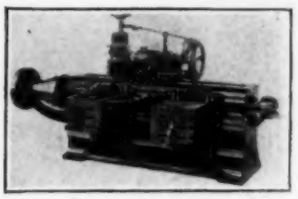
Dimensions: Stroke 64 in., longitudinal feed, 9 ft., vertical feed, 5 ft., maximum distance from the ram to the floor, 7 ft. 8 in., minimum distance, 2 ft. 6 in., extreme height, 14 ft. 6 in. and size of floor plate, 12 ft. square.

— 93 —

Shaper, Traversing-Head, 14-Inch

G. Swift & Sons, Ltd., Halifax, England. [Vol.69,p.119E]

The maximum stroke of this traversing head shaper is 16 in., and the bed is 6 ft. long by 17



in. wide and 34 in. deep, and the traverse of the headstock is 4 ft. 5 in. The drive is through a four-speed cone pulley and double-reduction spur gearing. The final drive is by a slotted link connected to the ram.

The ram has square side gibs and a circular face at the front to accommodate the toolslide, which has a traverse of 8 in. The movements provided by the toolslide include vertical, radial, and angular adjustments, with power feed to the vertical and angular movements. The toolbox is indexed and swiveled through an arc of 180 deg. The headstock has hand and self-acting feeds in either direction on the bed.

The tables are of box section, 17 in. long by 15 in. wide, by 12 in. deep, and work can be bolted to any face. The machine admits 15 in. between table and tool. Each table has vertical and horizontal adjustments.

Weight 5,400 lb. net.

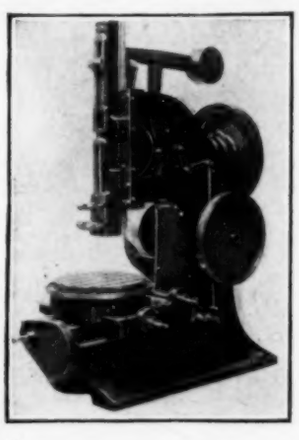
— 94 —

Slotting Machine, Side-Driven

Carter & Wright, Halifax, England. [Vol.68,p.290E]

Driven from the side instead of from the rear, this 10-in. stroke slotting machine has a Whitworth quick-return motion placed at the rear and a tilting worktable. It admits work 42 in. in diam. and 14½ in. deep. The table, which is 20 in. in diam., is dished out all around, and is provided with planed T-slots. With the slide, it has a traverse along the bed of 15 in., and a transverse movement along the slide of 15 in.

All the table movements, transverse, longitudinal and circular, are self-acting. The table



will tilt up to 5 deg. for taper cutting by means of an eccentric shaft. The counterbalanced ram works in continuous bearings, and is serrated at the front face.

The machine is driven from a three-speed cone pulley through spiral gears. The stroke motion gives a return of 2 to 1. The feed is taken from a cam on the main driving shaft.

Floor space, 6 ft. 3 in., by 4 ft. 6 in.; weight 3,500 lb. net.

— 95 —

Slotter, High-Production, 20-Inch

Butler Machine Tool Co., Ltd., Halifax, England. [Vol. 69,p.63E]

This 20-in. slotter of the high-production type is driven by a 50-hp. cross-feed motor with a separate small motor for the quick forward movement of the table, the two motors being interconnected.

For the stroke movement, the firm's eccentric device is employed, and it is stated that change of stroke can be accomplished in 30 sec. The tool-

holders are of forged steel, and if required, relieving toolheads are available. The feed motion is obtained from a cam in the rear driving wheel, motion being carried to the front of the machine where a reversing in-feed stop box is provided. The circular table is fully divided along its periphery into degrees.

The standard 20 in. slotter has four speeds. Without an extension holder, it will admit work 6 ft. in diam. or 7 ft. 1 in. in diam. with an extension toolholder, the maximum depth admitted being 2 ft. The circular table has a working face 3 ft. 9 in. in diam., the traverse of the table is 3 ft. by 2 ft. 9 in., and the standard cutting tools are 2×1½ in. in section.

Weight 15,000 lb. net.

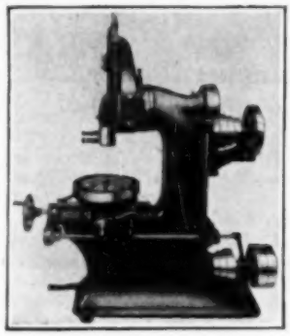
— 96 —

Slotting Machine, Toolroom, 6-Inch

Harry F. Atkins, Old Fletton, Peterborough, England. [Vol. 69,p.87E]

The table of this toolroom slotter is 16 in. in diam., and work 9 in. high by 24 in. in diam. can be admitted. The head swivels 10 deg. each way. The cutter ram is now provided with a quick-return action. The end of the ram carries a swiveling toolbox of the clapper variety. The ram is fully adjustable as to stroke and position.

The feed is transmitted to the work slides in the usual way by a picking motion, but the longitudinal and transverse feeds are worked through accurately cut screws with large micrometer dials. Automatic motion is provided here and also to the circular table, and all feeds are interlocked. The longitudinal motion is 10 in., and the transverse motion is 8 in. There are four feeds in both directions to each of the three motions. The circular table, which is ground, has machined T-slots, and is



graduated. It is arranged for wet work. The table can be turned by hand for setting purposes. A foot brake stops the ram at the top of its stroke.

Power required 2 hp.; weight 1,500 lb. net.

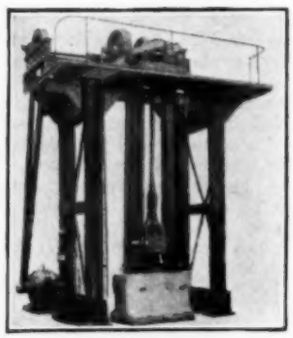
Hammers

— 97 —

Hammer, Drop, 1,000-Pound, Motor-Driven

Brett's Patent Lifter Co., Ltd., Coventry, England. [Vol. 69,p.73E]

This 1,000-lb. friction drop hammer is electrically driven. It is fitted with a guide rod of a new type, the object being to obtain greater strength, combined with a more permanent and accurate adjustment. Instead of the ordinary plain col-



umn, each rod consists of a combination of rolled steel girders and tapered V-segments. The steel work is permanently fixed, both at the top of the shaft and at the bottom in the block, where the lower ends fit into machined recesses, and are wedged permanently into position. They are fixed at a taper and the Vs are always parallel as the separate segments, which are bolted on to the machined faces in the steel work, are correspondingly tapered the reverse way.

By suitable worm motion, the segments can be moved up or down the tapered faces and opened out or closed in as required. Very accurate adjustment in the guiding of the hammer tup is therefore obtained. The lifter itself works on a lubricated system of friction, the friction blocks having renewable linings of "Ferobestos" material.

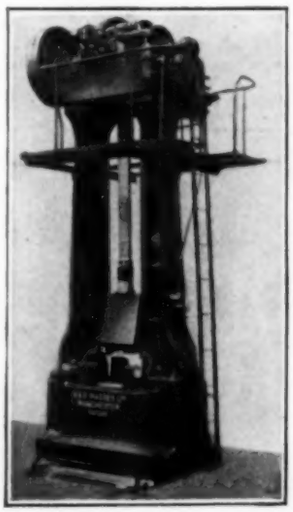
— 98 —

Hammer, Stamp, Friction-Drop, Automatic

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.69,p.200E]

This automatic drop stamp is made in a number of standard sizes ranging from 300 to 1,500 lb., in which the length of stroke can be varied by means of a foot lever while the machine is in operation. The point of pick-up at the bottom of the stroke may be set, as required, to allow for varying thicknesses of dies.

Slight depression of the foot



lever causes the tup to fall and strike automatic blows with short strokes. Further depression increases the stroke until, with maximum depression, the maximum fall is reached, the stamp working automatically meanwhile. The stamp can also be worked by hand in the ordinary way by means of a pull cord. The automatic action is obtained by the use of compressed air at a pressure of 30 lb. per sq.in. The stamps are self-contained.

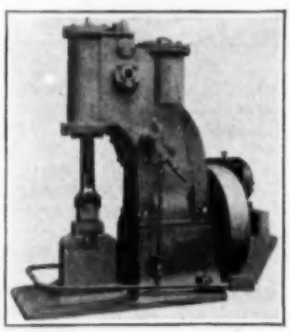
In the illustration, the 500-lb. size is shown, its longest stroke being 5 ft. The clear space between the guides is 13½ in., and the weight complete is 6½ tons.

— 99 —

Hammer, Power, Pneumatic, "Clear Space"

B. & S. Massey, Openshaw, Manchester, England. [Vol.69, p.71E]

The "Clear Space" pneumatic power hammer is shown in the 3-cwt. size. It provides a stroke up to 17 in., the distance from the front of the standard to the pallet centers being 1 ft. 3 in.



The tup pallet face is 6¾x5½ in., and the height of the anvil pallet face is 2 feet.

The machine will deliver 160 blows per min., and will work on mild steel bars 4 in. square. The valve gear allows a series of automatic blows to be given, light or heavy, long or short, and single blows can be struck as required from any position in the stroke. The change from single to automatic blows is made simply by movement of the hand lever or pedal which extends around the base.

A single casting incloses the hammer and pump cylinders, the valve chest and the upper portion of the standard. The baseplate is integral with the lower portion of the standard, the latter forming an oil sump with a pump actuated from the crankshaft. The piston, piston rod and tup are in one piece, and are of forged steel, heat-treated, machined all over and ground.

Total height, 7 ft. 9½ in.; baseplate area, 9 ft. 8 in. by 3 ft. 1 in.; weight, 4½ tons.

— 100 —

Hammer, Power, Spring

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.69,p.88E]

This 65-lb. hammer of the bow-spring type is suitable for working steel bars 1½ in. in diam., although, if necessary, steel bars up to 3 in. may be worked. Its operation is controlled by a foot lever and clutch. The length of stroke and the height of the tup can

be adjusted readily, and the machine will deliver 250 blows per min. for general work, but higher or lower speeds can be obtained.

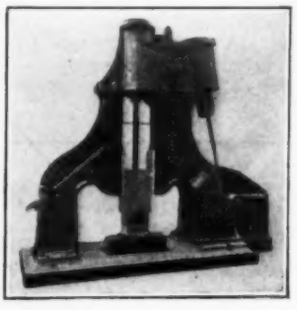
The anvil pallet face is 30 in. high, and the distance from the standard front to the pallet centers is 10½ in. The slides are adjustable for wear. The pallets are of steel, and are arranged diagonally so that long bars may be laid across them in either direction.

— 101 —

Hammer, Power, Pneumatic, Arch-Form, 40-Cwt.

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.69,p.188E]

In addition to the ordinary self-acting blows, this hammer can strike single blows of any power at any desired time, with the certainty that a second blow will not follow until the control



lever is again moved. The automatic blows, at the rate of 70 per min., may be light or heavy, long or short, and the single blows may be struck from the top of the stroke or from any intermediate position. The hammer will hold up at any point in the stroke, the tup rising smoothly, or it may be held down so as to grip work. The longest stroke is 41 in., and the clear space between the slides is 21½ in.

The drive is by electric motor. A single casting comprises the hammer cylinder, the pump cylinder, and the valve chest, the latter containing the control valve. The baseplate measures 18 ft. 3 in. by 8 ft. 2 in., and the height is 15 ft.

Weight 45¼ tons.

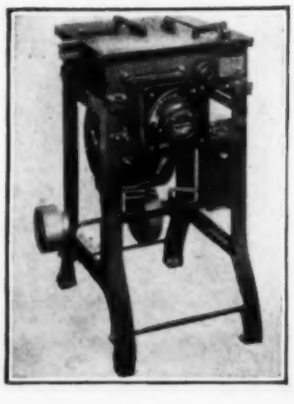
Sawing Machines

— 102 —

Saw, Motor-Driven, Self-Contained

Selson Engineering Co., Ltd., 28 Charles St., London, E. C., England. [Vol.68,p.218E]

The motor, carried beneath the saw table, drives the machine by belt through an intermediate shaft. All soft metals such as brass or copper, and also fiber can be cut. The table top is 18 in. sq. It can swing entirely open or may be set to saw any depth required. Parallel with the saw is a T-slot on which the cross-cutting gage is clamped. This gage may be adjusted lengthwise or swivelled to any angle up to 90 deg., in either direction. A slitting gage located on the other side may be



adjusted up to a distance of 12 in. from the saw face.

The center of the saw spindle is 1 in. below the surface of the table. For metal, 4-in. saws are used, while 6-in. saws are used for woodworking. The spindle speed is 2,000 rev. per minute.

Floor space, 18x24 in.; weight with the motor, 285 lb. net.

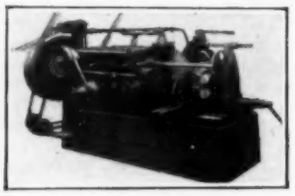
— 103 —

Sawing Machine, Cold, Improved 9-Inch

Alfred Herbert, Ltd., Coventry, England. [Vol.68,p.278E]

This machine will cut round bars up to 9½ in. in diam. in one cut and up to 12 in. in diam. in two cuts, and square bars up to 9 in. or 12 in. in two cuts. The saw is 28 in. in diam. and requires 10 hp. for driving. Eight feeds are available. The saw used has a tempered body and high-speed-steel inserted teeth. A stock-gripping device is employed having vertical and horizontal jaws and a top die between the body and the horizontal jaw, forming a rigid vise for holding a number of bars for multi-cutting.

An adjustable slipping clutch on the shaft of the lower feed



cone pulley yields under excessive stress. Automatic quick return to the head is engaged by a stop, and another adjustable stop regulates the position to which the saw returns. A bar feed attachment can be supplied. The traverse of the carriage is 6 ft., but bars up to 12 ft. long can be dealt with by taking a second grip.

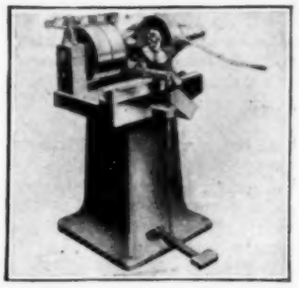
Floor space occupied 9 ft. by 3 ft. 9 in.

— 104 —

Sawing-Off Machine

Charles Taylor (Birmingham) Ltd., Birmingham, England. [Vol.69,p.70E]

This improved sawing-off machine is intended for the cutting of non-ferrous rods. It carries a saw 8 in. in diam. by 1/16 in. thick, and the drive is by means of fast and loose pulleys. The saw spindle is hardened and ground, the saw itself being protected by a detachable steel guard, which can be removed. It is carried in a swinging frame, which has a balancing device operated by a spring at the back. At the front will be



seen a steel guide plate suitable for round rods from ½ to 1¾ in. in. in diam. by 9½ in. long.

The stop provided is adjustable universally to allow for various sections and lengths, and the gripping device is operated by a pedal, which also has universal adjustment.

Height from floor to center 36 in.; floor space occupied 3 ft. 9 in. by 2 ft. 3 in.; weight 450 lb. net.

—105 —

Sawing Machine, Horizontal

Clifton & Baird, Ltd., Johnstone England. [Vol.69,p.90E].

This horizontal cold-sawing machine carries a 32-in. saw suitable for round bars up to 9 in. in diam., squares of 8½ in. on a side and I-sections 20x7 in. The drive is by 12-hp. motor and the machine can be arranged for belt drive. The saw is traversed automatically and on completion of the cut returns automatically.

The feed gears and clutches are inclosed in an oilbox and the feed can be changed while the cut is proceeding. All the control levers are duplicated.

The saw cuts upwards so that the saddle is held down to the bed. The work is held by a vise, which may be placed in either of two positions. Bevels up to 45 deg. can be made.

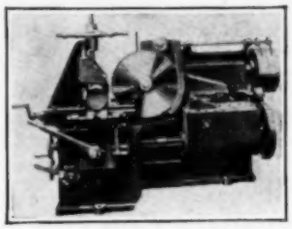
Floor space required 8 ft. 6 in. by 5 ft. 9 in.; weight 6,000 lb. net.

— 106 —

Sawing Machine, Circular

C. Wicksteed & Co., Ltd., Kettering, England. [Vol.69,p. 104E]

This machine will cut 6 in. square or round bars and joists up to 12 in. x 6 in. The saw



is of the inserted-tooth type, 22 in. in diam. by ¼ in. thick, and is removable.

Three cutting speeds provided are 115, 80, and 52 ft. per min., each with three feeds ranging from 13/16 to 4½ in. per min. A square-thread screw vise holds the work at right angles or up to an angle of 45 deg. A V-block supports round or square material.

The machine requires 6 hp. Overall dimensions, 7 ft. by 4 ft. 2 in.; weight 2 tons.

— 107 —

Sawing Machine, Vertical

Clifton & Baird, Ltd., Johnstone, England. [Vol.69,p.122E]

A saw 36 in. in diam. is carried on this machine, which has a maximum capacity of 24x8 in. Joists are placed on the machine with the webs horizontal, the saw being fed downwards automatically and being withdrawn automatically, with a

stop in each direction. It can also be moved up and down by hand.

The vises are self-centering to insure minimum depth of cut on joists, and two vises are provided so that a short length can be cut off at the end of the work.

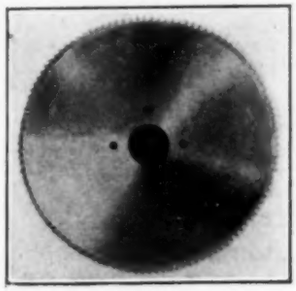
Floor space required 6 ft. 6 in. by 6 ft.; weight 12,500 lb. net.

— 108 —

Saw, Circular, Segmental, High-Production

Thos. Firth & Sons, Ltd., Sheffield, England. [Vol.69,p.136E]

These "Insto" circular saws for metal-cutting have a number of interchangeable segments of super high-speed steel riveted to hardened and tempered steel bodies, which are turned so that a shoulder is formed on each side of the rim, a central tongue being thus produced, over which the segments straddle and to which they are riveted. Saws of this type are made in a number



of sizes from 16 to 60 in. in diameter.

These saws are stated to be suitable for machines with a feeding capacity up to 10 in. per minute.

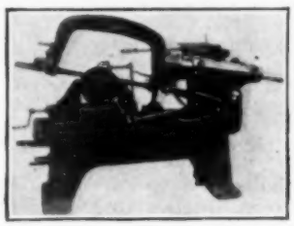
— 109 —

Hacksawing Machine, Heavy-Duty

E. G. Herbert, Ltd., Levenshulme, Manchester, England. [Vol.69,p.103E]

This 10x10-in. "Rapidor" saw runs at 160 strokes per min., using the company's Rapidor 18 per cent tungsten, high-speed steel blades. The machine can be driven by motor or belt. The drive is through friction clutches, and the machine is completely controlled from the front. Among the features claimed is quick cutting without the use of heavy weights, thus minimizing blade breakage.

The frame is released and lowered slowly to the work by a dashpot. By means of an adjustable stop, the machine is stopped automatically at any depth of cut. A length gage is available with double adjustment. Adjustable automatic lift is provided on the return stroke by an oil dashpot in conjunction



with the angular setting of the saw. The vise is of the heavy screw type bolted to the table, and it can be swiveled for making cuts at an angle, the loose jaw swiveling to grip taper or irregular work. The coolant pump is of the plunger type. Grease-gun lubrication is provided.

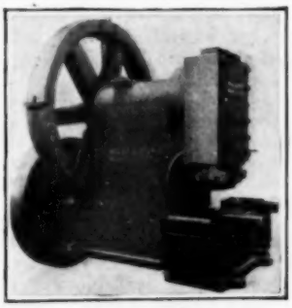
Other Machines

— 110 —

Bending Machine, Rail

Hulse & Co., Ltd., Salford, Manchester, England. [Vol.68, p.238E]

This machine will bend rails with the webs lying horizontally or vertically. The cast-steel ram has a stroke of 2½ in., and makes 30 strokes per min. It is



fitted with a renewable nose piece. Means are provided for disconnecting the ram from the eccentric so that its movement may be suspended without stopping the machine.

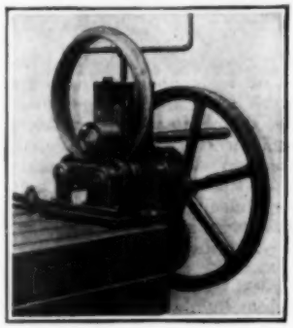
To provide the necessary momentum for bending, the machine is fitted with a heavy flywheel, and is driven by a belt to provide an elastic link between the machine and the 20-hp. driving motor. Adjustable spring-supported friction rollers at each side of the table facilitate handling of rails.

— 111 —

Bending Machine, Small

Midgley & Sutcliffe, Bradford, England. [Vol.69,p.289E]

This small hand-driven bending machine will handle 1½x1½x ⅜-in. angles cold. Two lengths are placed back to back. The



machine is of the plain three-roll type driven through double gears by means of a large flywheel, to which the handle is fixed. Hardened steel rollers are used. The top roll, which exerts the pressure, is carried in a long slide with extra long bearings to prevent lifting. Similarly, the bottom rolls have extended bearings. The above section can be bent down to a diam. of 12 to 15 in. The machine will bend material of other sections when suitable rolls are employed.

— 112 —

Broaching Machine, Four-Speed

H. W. Ward & Co., Ltd., Birmingham, England. [Vol. 69,p.79E]

A 3-in. square hole can be broached from a round hole in mild steel on this machine. The stroke is 50 in., and the broach

is returned at a constant speed of 28 ft. per min. Four cutting speeds are available, the range being from 4½ to 21 ft. per min. Two are controlled by lever and two by change gears. In addition, other speeds can be obtained by means of other change gears. The drive is through cone clutches, held in engagement by a compression spring. The reverse drive is through a friction clutch. At the top of the headstock is a trough, into which oil is forced by a pump driven direct from the pulley shaft. The oil is led by tubes to the bearings and to the draw screw nut, a sight gage indicating the oil level. The drawhead is mounted in the slide, having taper gibs. The quick-acting chuck is attached to a vertical slide with rule and pointer to facilitate the setting. Dogs form automatic stops at each end of the stroke. The outer end of the arm is machined and has a 5 in. hole through the center, providing means for attaching the work bushes and special fixtures. A pump supplies cutting compound to the broach.

Weight 3,000 lb. net.

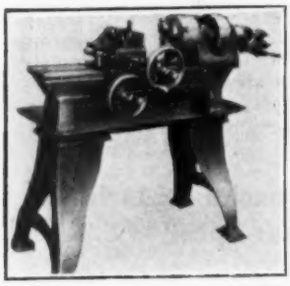
— 113 —

Centering Machine

J. Holroyd & Co., Ltd., Milnrow, England. [Vol.69,p.98E]

This centering machine has a capacity for work up to 4 in. in diam. A special feature is the universal chuck with three ball-bearing rollers. The machine deals with round stock,

square or hexagon bars, and is also used for centering forgings and stampings. The turned work which is to be ground, is held within three hardened steel rollers bearing lightly against it, the roller chuck revolving against the work. When centering other work, the chuck remains stationary, but the three



roller jaws can still be used for the purpose of steadying the work.

In all cases the work is gripped in the V-blocks of the self-centering vise and does not revolve, but can be moved forward by racking the saddle. The centering drill always revolves, the drive being quite independent of that which revolves the roller chuck. The height of centers is 6 in. and the bed is 3 ft. 7½ in. long.

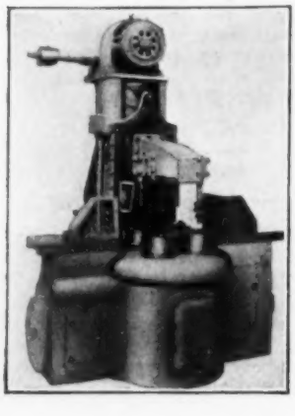
Floor space required, 5 ft. by 3 ft. 7½ in.; weight 800 lb. net.

— 114 —

Chucking Machine, Automatic, Vertical, Four-Spindle

Colchester Lathe Co., Colchester, England. [Vol.69,p.68E]

This four-spindle, vertical, automatic chucking machine will take work up to 9 in. in diam. The machine consists of a main slide, which rises and falls, and two side slides which move forward and back, horizontally. These three slides carry all the cutting tools. There are four spindles, each of which is stationary in turn when it becomes the unloading and loading station. With the exception of loading and unloading, the machine is entirely automatic. The



cams are permanent and do not need to be changed. Spindle speeds and feeds are changed easily.

The main driving shaft is driven through a friction clutch. The spindle-driving shaft drives the four spindles by clutches, which are arranged to declutch in the loading position. Any speed from 25 to 100 r.p.m. can be obtained by altering two gears only.

The vertical slide, from which all boring and turning is done in an axial direction, is driven by a fixed set of cams on the top cam drum. It is balanced and has a vertical travel of 7 in., the cutting travel being 6 in. The side slides, which do all the cutting in a radial direction, are driven from the two side drums by rocking levers. They have a travel of 6 in. and a cutting travel of 4½ in. The rate of cutting feed is variable from 24 to 120 cuts per in. The machining time for any piece is the time for the longest single operation.

Power required 10 hp., floor space occupied with tray 6 ft. by 6 ft., weight complete with motor, tray, pump and connections, 6½ tons.

— 115 —

Chucking and Turning Machine, Automatic, Vertical, Six-Spindle, 8x8-Inch

Ryder & Son, Ltd., Bolton, England. [Vol.69,p.104E]

Chuck work for turning between centers can be done on this six-spindle "Verticalauto" in the 8x8-in. size illustrated. The machine has five working stations, with one loading and

one unloading position. Five sets of tools operate from the central vertical hexagon toolslide, and at four stations, horizontal turning tools can be used, placed on slides on the right- and left-hand side boxes. Tools are withdrawn rapidly by power.

For indexing, a self-aligning, self-adjusting plunger operates at twice the radius of the work spindles. Tools are of standard single-point design. Two types of automatic cross-slides are available, one of which is specially arranged for such work as under-cutting. A motor drilling attachment is also available, the drills being rotated in the opposite direction to that in which the work is moving.

The machines are built on the unit system, the two sides being detachable from the body. Drive is by means of a 14-hp. motor.

Floor space required 9 ft. 9 in. by 7 ft. 6 in., and weight 16,000 lb. net.

— 116 —

Screw Machine, Automatic, with Flanged-Motor Drive

Charles Churchill & Co., Ltd., Finsbury, London, E.C., England. [Vol.69,p.155E]

This No. 1 Petermann automatic screw machine, while of the firm's regular design, embodies a number of improvements directed to increase the efficiency and ease of set-up. The maximum size of stock taken is $\frac{5}{32}$ in., and the maximum length turned is 2¾ in. The maximum diameter threaded is $\frac{5}{32}$ in. in brass or $\frac{3}{16}$ in. in steel. The machine is also available with a spindle to take $\frac{7}{32}$-in. bar stock.

The headstock is actuated through a lever by means of a cam and slides on V-ways. The spindle speed may be up to 5,700

r.p.m. on regular production. Two horizontal cutting tools are carried on a rocking arm, which pivots in a support for the vertical tools. The rocking movements are controlled by cam and operate successively. The vertical toolholders slide in a massive support. A special feature is the two lower toolslides, which have micrometer adjustment. The upper tools are provided with micrometer adjustments also, and all toolholders can be adjusted sideways. Circular form tools can be accommodated on the two lower slides.

The drive is by 1-hp. motor of the flange-fixing type. Another feature is the automatic stop incorporated in the stock feed tube. The attachments provided include a right-hand threading device for external threads operating on the differential system, a combined milling, threading and tapping attachment, a two-spindle drilling attachment, a thread-splitting attachment, and a taper-turning attachment.

Weight, with motor, 1,100 pounds.

— 117 —

Automatic Rod Magazine for Screw Machine

Buck & Hickman, Ltd., Whitechapel, London, E., England. [Vol.69,p.57E]

This external feeding mechanism, known as the automatic rod magazine, is suitable for attachment to the No. 00 size of the regular high-speed Brown & Sharpe automatic screw machines.

The mechanism, described on page 672, vol. 68, of the *American Machinist*, consists of an arrangement holding several rods, and is placed at the left-hand end of the machine. It replaces the stock stands generally used. When the machine is in operation, a new rod is automatically fed into the working position as the preceding rod is used up. The magazine is operated by the machine itself. Its operation is timed in relation to the automatic functioning of the machine.

— 118 —

Cutting-Off Machine, Rotary, with Power Feed

Charles Taylor, Ltd., Birmingham, England [Vol.69,p.124E]

This machine is reviewed under item No. 133 of the American section of this issue.

— 119 —

Shape-Cutting Machine, Frame-Plate, Locomotive

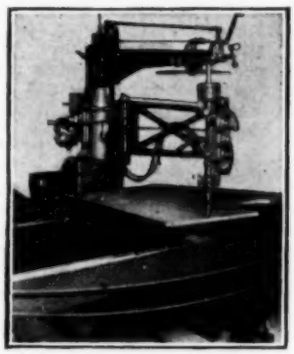
British Oxygen Co., Ltd., Upper Edmonton, N., England. [Vol.69,p.27E]

This machine cuts out locomotive frames practically without machining and at one setting, the frames being machined afterward where the usual machine surfaces are required. It has two heads, each very similar to the firm's standard universal cutting machine. The heads are mounted on saddles on a bed along which they can run, the speed being determined according to the thickness of the metal to be cut. Frames up to 44 ft. long by 4 ft. 3 in. wide can be dealt with.

The bed is 29 ft. long, made in four sections, and further

lengths can be added. The job is mounted on a built-up table supported by brackets. This can be dropped anywhere and the machine set to work. Each saddle with its cutting head has an automatic longitudinal feed. The heads are removed easily by hand. Each model is mounted on roller bearings, and all operations are controlled from one point.

The cutting blowpipe is mounted at the end of an articulated arm, and, when cutting forms, is guided by a templet



against which a tracing roller bears. A ½-hp. reversing motor, driving through a change-speed gearbox, rotates the roller, which moves around the edge of the templet, causing the blowpipe to produce the shape required. An attachment enables circular cuts of any radius up to 36 in. in diam. to be made automatically without templets. The articulation of the arm enables arcs 10 ft. wide to be described.

A gearbox gives 14 longitudinal cutting speeds ranging from 60 to 30 ft. per hour, and 26 speeds are available for profile work, from 60 to 10 ft. per hour. The cutters employed are of the firm's standard type. With acetylene the machine will cut steel up to 12 in. thick and with ordinary coal gas up to 8 in. thick.

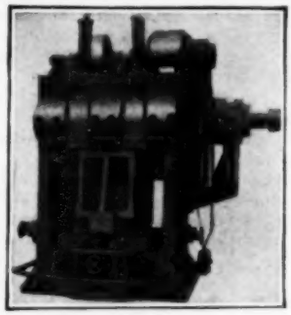
— 120 —

Shears, Notching and Coping

Scriven & Co., Ltd., Leeds, England. [Vol.68,p.228E]

This machine was designed for work on girders or channel bars from 6 to 24 in. in depth. The notches may be cut either square or rounded.

A cast-iron body carries the spring-balanced steel shearing slide in V-guides and the lower shear blades in detachable steel blocks. The slide is actuated by a forged steel eccentric shaft driven through triple gearing by a 20-hp. motor mounted on the top of the frame. Either single or continuous operation can be obtained. The stop motion can be controlled either by a foot lever or by a pneumatic cylinder.



This machine will notch out the flange in any part of its length. The cutting heads on the slide are of cast steel. The center handwheel moves the front slide for right- and left-hand cuts, while the two side wheels adjust the gages for depth of cut from the end of the girder or bar.

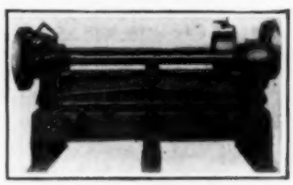
Floor space, 10 ft. 6 in. by 6 ft. 9 in.; overall height 11 ft.; weight 22 tons.

— 121 —

Shears, Guillotine, High-Speed

Scott Bros., Ltd., Halifax, England. [Vol.68,p.239E]

Plates up to 6 ft. wide by $\frac{7}{16}$ in. thick can be sheared on this machine. A short gap, 3 in. deep, enables the edges of plates of unlimited lengths to be trimmed. Springing is avoided



by using an additional beam at the rear of the top blade.

The ram stops automatically at the top of each stroke, and is restarted by means of hand lever. The machine gives 25 strokes per min., and continuous cutting is possible. A spring-pressure hold-down device is brought into operation automatically at the commencement of each stroke and lifts clear at the top of each upward stroke. The table has two extension arms in front, in addition to two adjustable front gages, an adjustable length gage being fitted at the rear.

Floor space required, 9 ft. by 5 ft.; power required, 6 hp.; weight, 6,100 pounds.

— 122 —

Shearing Machine, Hand, Portable

Clifton & Co., Ltd., Sheffield, England. [Vol. 69,p.17E]

This portable shearing device which can be clamped to a bench, has been introduced in Great Britain by the above company as agent for Levaillant Frères, Basel, Switzerland. It has been designed for the use of sheet-metal workers. The device will cut sheets of any size either straight or curved, and will deal with steel plates up to 3-64 in. in thickness and brass

and other soft metal sheets up to $\frac{3}{32}$ in. thick, cutting shavings down to $\frac{1}{64}$ in. in thickness.

One blade of the device is fixed and the other is rotated against it by means of the handle. The moving blade is in section part of a cylinder and the cutting edge is of helicoidal form. The advantage of this construction is claimed to be that the cutting edge and leverage are constant throughout the length of the cut. The appliance is sharpened easily.

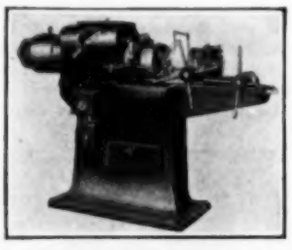
— 123 —

Threading Machine, Bolt, Flanged-Motor Type

B. Elliott & Co., Ltd., York Road, London, N., England. [Vol.68,p.207E]

Six sizes of dieheads give this machine a range for threading bolts from ¼ to 4 in. Production of ½-in. mild steel bolts, thread 1 in. long, equals 340 per hour; and 200, 1¼-in. bolts having threads 3¾ in. long per hour.

A flanged-motor drives the machine, which is available in



single- and two-spindle models, which will cut both right- and left-hand threads. On the two-spindle style, the spindles may be run in opposite directions. Stopping and starting of each spindle can be independently controlled. The speeds are changed through a 5- or 10-step gearbox.

Each diehead has four tangential chasers carried in pivoting holders. An adjusting ring operated by a worm is attached to the hardened-steel worm ring for varying the diameter. Special chaser holders enable right- and left-hand threads to be cut with the same diehead.

— 124 —

Welding Machine, Arc, Universal

British Secheron Co., Ltd., Abbey House, Victoria St., London, S.W., England. [Vol. 69,p.133E]

This universal arc, spot and butt welder is designed as a general maintenance unit with which annealing and also heating can be done. Arc welding currents up to 180 amp. are available with maximum overload of 80 per cent. The current can be controlled in six stages, with two additional positions for overload for heavy metal. For butt welding, the

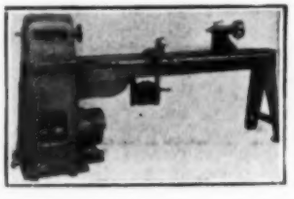
work is held in jaws, a lever pressing the two ends together to complete the weld. For spot welding a spring is used for applying the pressure. Spot welding can be done up to a total thickness of ½ inch.

— 125 —

Lathe, Pattern Makers, 8-Inch

Wadkin & Co., Leicester, England. [Vol.69,p.77E]

The lathe illustrated will take work 5 ft. 4½ in. between centers and 13 in. in diam. over the hand turning and traveling rack slide rests. The bed may be either plain or with a gap and filling-in piece, the diameter



turned in the gap being 2 ft. 4½ in. in diam. and 6¾ in. wide. The spindle is screwed at the back of the head to take an 18-in. faceplate. Machines of the same design are made with 6 in. height of centers to take work 3 ft. 4½ in. between centers and with 10 in. height of centers and 7 ft. 4½ in. between centers.

The motor is of 1½ hp., either d.c. or a.c., and takes a 4-speed driving cone pulley. Spindle speeds are from 240 to 2,880 r.p.m. The main spindle runs in ball bearings and end thrust is provided for. The tailstock has a steel barrel and square-thread screw and the centers used are self-discharging. The tailstock sets over for taper turning. The toolpost is slotted to take turning tools which have spacing collars, and is mounted on a graduated swiveling device.

Weight 1,250 lb. net.

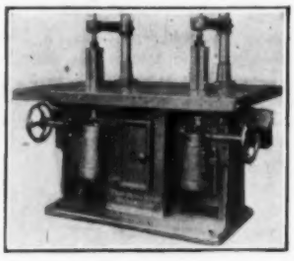
— 126 —

Molder, Circular, Motorized

T. Robinson & Son, Ltd., Rochdale, England. [Vol.69,p. 111E]

This double-spindle, circular molder for wood working is driven by electric motors. For constant-speed, the motor control is by push-button, while for multiple-speed motors a push-button starter is used, together with a hand-operated switch for changing speeds and reversing. Three speeds, namely, 3,000, 4,500, and 6.000 r.p.m., are supplied by the multiple-speed motor.

The table has a number of tapped holes for setting fences, and may be slotted. Concentric



filling-in plates are provided to suit cutters of various diameters. The cutter spindles are mounted in ball bearings inclosed in dust-proof housings, and are detachable to suit the type of cutter employed. The spindles have parallel shanks, and are held down against collars, except where the multiple-speed motors are used.

Machines of this type are available in two sizes, to deal respectively with timber up to 6 and 5 in. deep. The larger machine has a table top 6x3 ft., the spindles being at 42 in. centers and the machine taking 10 hp. The smaller machine has a table top 5 by 3 ft., with spindles at 30 in. centers, and taking 6 horsepower.

— 127 —

Die-Casting Machine, and White Metalling

Wild-Barfield Electric Furnaces, Ltd., Holloway, N., England. [Vol.69,p.92E]

This die-casting machine is also intended for the white-metalling of automobile bearings under pressure. The furnace is electrically-heated and the iron pot in the center has a simple, hand-operated force pump with an outlet to the mold.

The mold is held down during the operation by means of a screw.

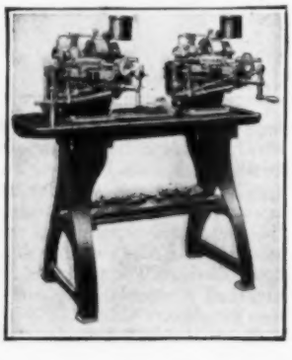
The temperatures attained are those which are for the white metal range. The container is 7 in. diam. by 7 in. deep. It holds about 50 lb. of metal, and the time required to heat the furnace from the cold to the working temperature is 50 min., with a consumption of 3.5 kilowatts.

— 128 —

Drill Manufacturing Machine, Small, Improved

H. Hunt & Sons, Old Trafford, Manchester, England. [Vol.69,p.80E]

Wire drills can be produced on this machine. The drill rod, cut to length, is placed in a self-centering chuck. The chuck is placed in the work spindle at the right-hand side for fluting,



and is set off at the left-hand side for clearance milling. The spindles are adjustable so that the correct amount of land is left. Both heads are under the control of one operator. A quick return has been incorporated.

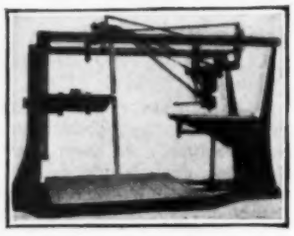
Coolant is fed on the work by a pump. The machine is built in two sizes for drills up to ½ in. in diameter.

— 129 —

Engraving Machine

New Fortuna Machine Co., Ltd., Southmead, Bristol, England. [Vol.69,p.98E]

The cutter spindle head of this machine is suspended on cross and longitudinal runners so that the combination of these movements allows the cutter to travel in any direction over the surface of the work table. The vertical tracer rod has its top end attached by a universal ball connection to the carriage for the cutter head. The lower end is in contact with the copy. In



practice this arm acts as a lever with an adjustable fulcrum formed by a support, and any reduction is effected by adjusting this support.

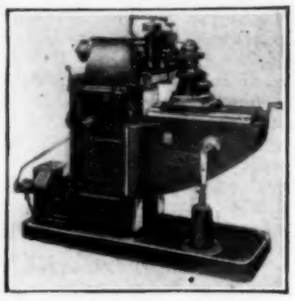
The spindle is driven by a 1/20-hp. self-contained vertical motor, giving a spindle speed of 3,500 r.p.m. The vertical movement is controlled by a lever near the work. The work table surface is 18x18 in., with eight slots for clamping purposes. It is of the knee type, and has a tilting arrangement. Horizontal adjustment is available by means of a double-hinge arrangement. The copy table provides the exceptionally large area of 36x36 inches.

— 130 —

Tooth-Rounding Machine, Automatic

J. Lang & Sons, Ltd., Johnstone, England. [Vol.69,p.125E]

Teeth on gears from 2½ to 26 in. in diam. can be rounded on this machine, the maximum and minimum pitches being 3 and 12 D.P., respectively. Gears of 8 D.P. can be rounded at the rate of 20 teeth per min. The machine may be driven by a single pulley and is adaptable for motor drive. The headstock has three spindles, the outer one having a U-shaped slot along



its length, and mounted in bearings at each end. A cam and rack motion provide a semi-rotation to this spindle. Another spindle is carried in the slot of the outer spindle and can be adjusted to give the throws needed for different pitches. It is indexed at each end to insure parallel adjustment. The inner spindle carries the rounding cutter, which runs on ball bearings inside the second spindle.

A cam controlling the dividing is fixed at the front end of the outer spindle and operates through a lever mechanism to a dividing bar, an index providing means for accurate adjustment for the various pitches.

The feed motion is obtained from wheels mounted on fixed centers, and four feeds are available. The work mandrel is adjustable horizontally. For convenience in changing work, a clutch mechanism enables the feed mechanism to be stopped without stopping the machine.

Weight, 2,570 lb. net.

— 131 —

Twisting Machine, Rail

Hulse & Co., Ltd., Salford, Manchester, England. [Vol.68, p.238E]

This machine was designed for the cold working of the heaviest rails. It is capable of putting either right- or left-hand twists on rails up to 15 deg. The rails are fed through the

dies, the rotating die being mounted in a cast-steel lever, which is rotated by a traverse screw. The machine is coupled to a 20-hp. motor mounted on an extension bracket on the main frame.

— 132 —

Rule, Vernier, Steel, Large

Buck & Hickman, Ltd., Whitechapel Road, London, E., England. [Vol.69,p.123E]

Two large steel rules made by J. Chesterman & Co., Ltd., Sheffield, have been placed on the market by the above company. The smaller is used for measuring nominally up to 2 meters or 80 in. A beam is used, its section being 3 by 2 in., and into this a steel rule is let and secured by screws. The appliance is accurate to within 0.001 in. or 0.02 mm., and is intended for use in the inspection department and toolroom for

accurate measuring or gaging.

Measurements are taken from hardened steel plugs on blocks, but flat jaws may be substituted. Both external and internal measurements can be taken, but for the latter the minimum dimension is 4 in. The block carrying the moving measuring plug has screw adjustment with vernier.

Another sliding rule measures 100 and 64 in., respectively, on the two scales. It has no screw adjustment, and is intended for less accurate work than the above.

Gaging and Testing Equipment

— 133 —

Testing Machine, Dynamic, Improved

C. F. R. Giesler, Ltd., 324 Gray's Inn Road, London, W. C., England. [Vol.68,p.238E]

The ultimate bending stresses of materials can be determined within about 20 min. on this dynamic testing machine. The procedure consists in determining the energy-absorption curve for the sample test piece. This is compared with the standard curve and immediately shows whether the materials are up to the specifications. The tests determine the limit of alternate bending stresses to which a specified material can be sub-

jected under working conditions without fracture.

The design is based on the principle of rotating a test piece, which is subjected to bending stresses. The test piece has taper ends that fit into the floating ball bearing carriers. The stressing mechanism consists of a weight, which may be adjusted on a beam by a handwheel. The motor drives the test piece through a flexible shaft, and has a counting mechanism for recording the number of revolutions. To verify the energy absorbed, the degree of heating of the test rod, a thermo-recorder is placed on the test piece. Two dial indicators are used for measuring the degree of bending in the part under test.

— 134 —

Testing Machine, Hardness, "Cloudburst"

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.68,p.237E]

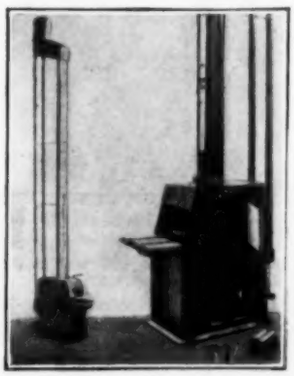
The above machine and the projection microscope for use in conjunction with it are reviewed under items Nos. 207 and 211, respectively, the American section of this issue.

— 135 —

Testing Machine, Hardness, for Production Work

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.69,p.177E]

The "Cloudburst" hardness testing machine, invented by E. G. Herbert, has been developed into a power-driven machine, which is intended essentially for production testing. The principle of the process is reviewed under item No. 211 of the American section of this issue. The machine referred to is of larger size, the surface dealt with being 12 in. square. In this machine the adjustable piston is replaced by an adjustable hopper, in which is a slot 12 in. long. The fall is determined by a scale as before.



The ball drops through the slot on to the working table, this table being moved across the curtain of falling balls, so that an area 12 in. square is covered. After striking the work the balls fall into a chute, and are lifted once more mechanically by a conveyor to the top of the machine, thence falling into the adjustable hopper. For this purpose a motor is mounted in the base and provides means for moving the table to and fro and for revolving the work should this be necessary.

— 136 —

Measuring Screen for the "Cloudburst" Hardness-Testing Machine

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.68,p.250E]

This screen is reviewed under the Herbert Projection Microscope, item No. 211 in the American section of this issue.

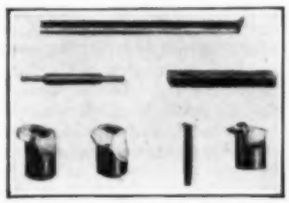
Small Tools

— 137 —

Boring and Internal Threading Tools

Wearden & Guylee, Ltd., Bradford, England. [Vol.68,p.290E]

The "Fanger" tools of Swiss make are manufactured in three types for plain boring with heavy cuts, bottoming, facing and external flanging, and internal thread-cutting, respectively. The tools are of circular form so that they can be reground readily. They are screwed



against the shoulders at the ends of the steel bars, by which they are held in a machine.

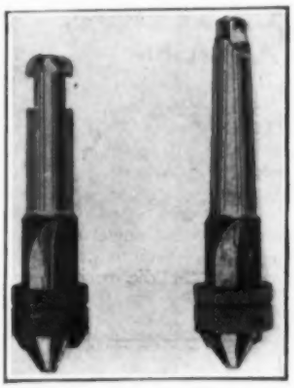
The cutters are of alloy steel containing 22 per cent tungsten. The tools below ½ in. in diam. are double-ended. The largest shank available is 1⅛ in. For internal threading, they are supplied to cut Whitworth threads.

— 138 —

Countersinking Tool

Edgar Allen & Co., Ltd., Sheffield, England. [Vol.68,p.208E]

This Barnes countersinking tool is made in two sizes for rivets from ½ to 1¼ in. inclusive, and may have floating straight, Morse taper, or square taper shanks. The countersink is made of high-speed steel, and has three cutting lips, formed by



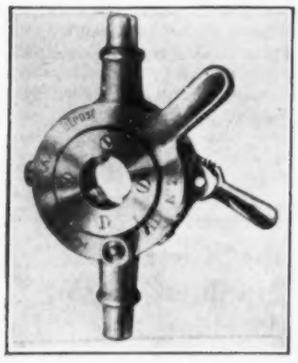
three flutes. These flutes may be either straight or spiral. The cutting edges may be ground to 45 or 60 deg., or to Lloyd's angle. The circumference of the tool is threaded to carry two ring nuts of cast steel, the lower ring bearing two tongues, which act as stops, the upper ring locking the lower.

— 139 —

Die Stock, Improved

Virax Die Stock Co., 57 Doughty St., London, W. C., England. [Vol.69,p.176E]

This die stock is made in the Paris works of the above concern, and its main characteristic is simplicity, coupled with its capacity of producing clean and accurate threads. It consists of only five parts. The dies are carried in slots in the body of the stock and have projecting pins, which engage with the top scroll plate. The handle of this enables fine adjustment to be made, and the stock is marked so that a maximum variation of ⅛ in. on the diameter of the thread can be accurately obtained, although the actual capacity of the stock is considerably larger.



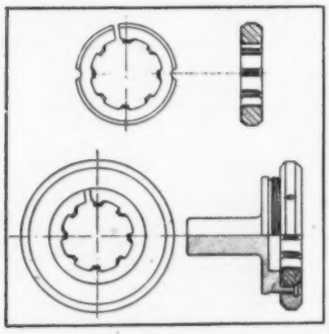
When the work has been finished, the chasers can be withdrawn quickly. The dies are of Swedish crucible cast steel, ground on the faces. The stock is boxed with or without taps and multi-thread sets cover Whitworth, B.S.F. and metric threads as required.

— 140 —

Die, Threading, Adjustable

J. Harper & Co., Ltd., Willenhall, England. [Vol.68,p.270E]

This split die has two half-round grooves formed in its periphery. These grooves correspond with similar notches in the body and dowel pins are inserted in them to prevent rotation of the die relative to the head. The die is held in the



body by means of a ring, which is screwed on the exterior of the body.

At the outer edge, the ring is tapered internally to correspond with a similar taper on the periphery of the die. Thus when the ring is screwed up, the die is compressed, the split allowing it to close to the size required. The die is formed with a taper at both sides of the periphery so that it can be reversed.

— 141 —

Files, Large Size

Sheffield Steel Products, Ltd., Templeborough Works, Sheffield, England. [Vol.69,p.151E]

The large file shown in the illustration measures more than 50 in. It is of the double-handle type, and when used is operated by two men. The cross-section is but 1 by ¼ in. As the file was too long to be accommodated in the largest grinding machines, this operation had to be done by hand. Tests on the cutting portion showed

uniform hardness and cutting properties quite up to the standard of any files of ordinary dimensions.

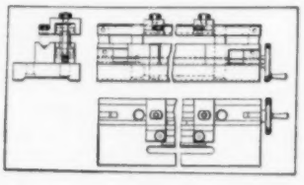
— 142 —

Jig, Pin-Drilling

Ratcliffe Tool Co., Ltd., Clun House, Surrey St., Strand, London, W.C., England. [Vol. 69,p.60E]

Three sizes of these universal pin drilling and tapping jigs have been introduced. The smallest is suitable for work from ⅛ to ¼ in. in diam. by 6 in. long, and the largest for work from ½ in. in diam. up to 1¼ in. in diam by 15 in. long. The device is similar to one of the firm's jig tools, "The Jigometer," of which an account was published in the issue for Sept. 10, 1927, p. 50E.

The pin jig is intended for the accurate drilling of cross holes in pins and shafts. A cast-iron base supports a steel beam, which carries adjustable holders or master holes for the drill bushing. The work is held in a steel V-block, a clamp being used, which is not shown. This consists essentially of a



block supported on the base of the jig and carrying a finger that grips the job. At the left-hand end, the V-block has a stop for the work and, if desired, the V-block itself can be made in two pieces to accommodate work having a collar or similar projection.

The drilling bushings are adjustable along the beam to a scale, which is graduated either in English or metric divisions. The graduated beam can be raised or lowered as desired. For tapping purposes the bushings are removed, the master holes being protected by a hardened steel liner that replaces the bushing.

— 143 —

Vises, Swivel

J. Parkinson & Son, Shipley, England. [Vol.68,p.288E]

Three types of swivel vises have been introduced by the above firm. They are, a vise having a base with a ball projection on which it can be swiveled in any direction and clamped as required by lever; a swivel base vise with conical socket, and an expanding-ring swivel base vise. The second type has an overhung swivel base suitable for clamping to the edge of a bench and will carry any of the firm's "Handy" vises, in sizes up to No. 3. The vise is bolted to a conical flange

bushing, which sets into the socket. The bases are made in five standard sizes of the same general design.

The expanding-ring swivel base is used for vises up to the No. 3E "Handy" which has a width of jaw of 8 in., and opening of 9¼ in. The vise is offset, and the expanding ring by which the parts are held together is tightened into its recess by means of a wedge-shaped nut.

Miscellaneous

— 144 —

Panels, Motor-Control, D.C.

British Thomson-Houston Co., Ltd., Rugby, England. [Vol. 68,p.270E]

These control panels are for use with non-reversing, constant-speed, d.c. motors, and are arranged for wall or pedestal mounting. The pedestal form is suitable for shunt-, series- or compound-wound motors of from 0.25 to 7.5 hp., and voltages ranging from 100 to 600. The pedestal form is suitable for similar motors of from 3 to 18 hp. Both panels may be used on systems having either neutral or ground wire, and are rated for starting twice an hour against full-load torque.

In each case, a thermostatic starter, line switch, fuses, low-voltage release and an over-current relay are provided. The switch in the smaller panel has button contacts, while the larger has renewable contacts. In both sizes of panel, the starting resistance consists of porcelain-

ended fireproof tubes. The overload relays can be set to operate at 100, 125, or 150 per cent of full-load rating.

These panels conform to the Home Office regulations and British Engineering Standards Association specifications.

— 145 —

Panel, Motor-Control, A.C.

British Thomson-Houston Co., Ltd., Rugby, England. [Vol. 68,p.279E]

This motor-control panel is used for non-reversing, slip-ring, induction motors, the maximum rating being 30 hp., 600-volts, rotor current 125 amp., and full-load stator cur-

rent 75 amp. It is self-contained for wall mounting and controls both stator and rotor circuits, all components being interlocked. A contactor circuit breaker controls the stator circuit. Three thermal-type, over-current relays are provided, one in each stator phase. Remote control by means of push buttons can be provided, and an ammeter may be mounted on top of the case.

The drum starting switch has renewable segments and contact finger tips.

— 146 —

Heating Units, Electric

G. Bray & Co., Ltd., Leeds, England. [Vol.68,p.261E]

"Chromalox" heating units may be sold in any part of the world except Canada and the

United States by the above company. The units provide safe and easy means of using electrical heating for various industrial purposes. They are commonly made in the form of strips or rings.

The heating unit is of nickel-chromium ribbon or coil embedded in a refractory material.

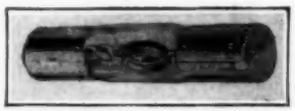
The terminals are of nickel steel for low-temperature work and of Monel metal for high-temperature applications. A rust-resisting iron is used for the metal sheathing on low-temperature work. Rustproof sheathing is employed where high temperatures are encountered. Among the applications is that of heating whitemetals, where it is claimed that, owing to the ease of temperature control by the use of thermostats, the minimum of oxidation of the metal occurs.

— 147 —

Circuit Indicators, Electric

Philips Lamps, Ltd., 145 Charing Cross Road, London, W.C., England. [Vol.69,p.150E]

This neon indicator is used for indicating whether or not current is flowing through the circuit. It is small in size, measuring less than 2¼x¾ in., and the power consumption is ½ watt. It emits a light which,



though subdued, is discernible both in daylight and strong artificial light. The device is available in the form illustrated, as an adjunct to switchboards in factories and other large buildings having extended lighting systems.

The neon indicators are made for 100-250 volt a.c. and for 150-250 volts d.c. circuits of domestic or similar types, and are fitted with either bayonet or screwed caps. For power installations and switchboards, a double-ended 400-650 volt indicator is available as illustrated.

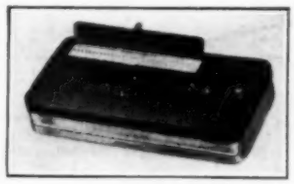
— 148 —

Meter, Foot-Candle

Philips Lamps, Ltd., 145 Charing Cross Road, London, W.C., England. [Vol.69,p.212E]

By means of this foot-candle meter, it is possible to insure correct lighting for work of various classes. The device consists essentially of a couple of 4½-volt flash lamp batteries connected in series, together with a comparison lamp, the light from which is thrown into a box of rectangular section tapered toward the end, the illumination in the box gradually diminishing in intensity.

The line of circular holes in a transparent white surface forms a graduated scale. The illumination of these holes decreases with the distance from the lamp. Somewhere between the two ends of the scale, depending on the intensity of the light to be measured, is a point which appears to be neither light nor dark, and from this the light intensity can be de-



termined by means of the calibrated scale, which reads direct in foot-candles.

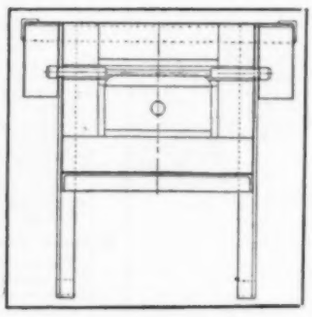
The scale provided measures from 1 to 45 foot-candles, but by a small lever the illumination provided can be reduced to one-tenth of its full value. The device has a possible life of over 1,000 hours.

— 149 —

Furnace, Electric, High-Temperature

R. M. Catterson-Smith, Lacland Place, King's Road, London, S.W., England. [Vol.68, p.250E]

This high-temperature furnace is heated from above by non-metallic resistance rods placed at intervals. The operating temperature is 1,300 deg. C. The rods are carried in a "Sillimanite" housing and may be re-



placed separately. The floor and sides of the heating chamber are also of Sillimanite, formed by five replaceable molded shapes. This chamber is surrounded by a 2-in. lining of heat-insulating brick.

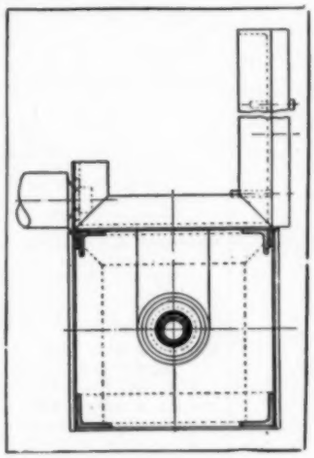
The framework is comprised of steel angles and strips, the external covering consisting of aluminum sheets. A pyrometer hole is provided in the back of the furnace.

— 150 —

Furnace for Brass Billets, Electric

R. M. Catterson-Smith Lacland Place, King's Road, London, S. W., England. [Vol.68, p.268E]

This tubular furnace, for the heating of brass billets for hot pressings, employs a cylindrical tube through which the billets are mechanically propelled. Four billets are handled, each billet being heated to a temperature of 800 deg. C. The tube is of "Staybrite" steel with ¾-in. bore, and having a flange at the rear end for inserting and removing the work. It is carried in a refractory tube 30 in. long, with



clearance to enable easy withdrawal.

A nickel-chromium resistance coil forms the heating element. The element is composed of a main section and a number of smaller auxiliary sections for varying the heat.

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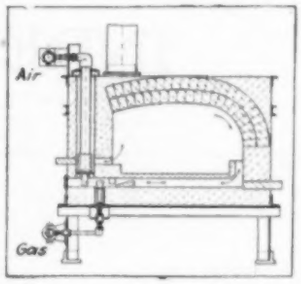
Furnace, Recuperative, Low-Pressure

Brayshaw Furnaces & Tools, Ltd., Manchester, England. [Vol.69,p.123E]

This improved "Lopress" recuperative furnace for hardening, case-hardening, annealing, heat-treating, forging, and billet-heating has the flow of air always in one direction. The heated gases circulate in such a way as to preheat the incoming air by means of the recuperative chamber that is built into the furnace wall.

With the furnace loaded with 7½ cwt. of cold iron or steel, the time for heating up to 750 deg. C. is 2¼ hr. The rate of recuperation was indicated by the outside air being heated to 500



deg. C. with the working chamber at a temperature of 900 deg. C. A reducing or oxidizing atmosphere can be obtained, as desired.

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Bushings, Snug, Improved, Morton

Glacier Metal Co., Ltd., Alperton, Wembley, England. [Vol. 68,p.277E]

This improved snug bushing is made of hard brass, the softer white or other metal being cast around it, and a complete bond

between the two being formed. This construction gives great resistance to shearing. The plate is made preferably in the form of a Maltese cross, as shown, curved to fit the bushing.

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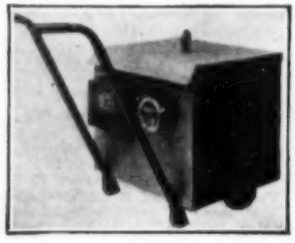
Welding Sets, Arc, A.C.

British Secheron Co., Ltd., Abbey House, Victoria St., London, S.W., England. [Vol.69, p.72E]

Five sizes of these arc welding sets are manufactured, the smallest supplying current from 25 up to 135 amp., and the largest up to 300 amp. These sets can be used on single-phase circuits or between two phases of three-phase circuits. A special three-phase set is available having a balancing coil, this set taking 10.5 kva. and the load being divided in the ratio of 2, 1 and 1 over the three phases. The sets are self-regulating.



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New Equipment at a Glance

The Shop Equipment Review number of the *American Machinist* is a semi-annual feature that was started in 1923 in response to demands from the field for a concise review of the equipment and parts descriptions appearing in the Shop Equipment News section of the paper. This number is thus the twelfth that has been published.

In compiling the material for this number all of the items appearing in the Shop Equipment News section for the previous six months, are included, and no others. The six months period is chosen because that is the interval included in a volume of the *American Machinist.* Misunderstandings having arisen on occasion, we are taking this opportunity to explain once more the sole eligibility requirement for items contained in this number.

The first few Shop Equipment Review numbers were confined to the description of the equipment and parts built in the United States. It soon became apparent, however, that the stimulation of English machine tool and equipment builders caused by the war was leading to activity on their part that demanded recognition. The steady increase in the number of items in the English section is evidence of the soundness of this decision. The original descriptions from which these items are made appeared in the European Edition of the *American Machinist* which is published in London.

A Semi-Annual Text of Machinery and Equipment

News of the Week

Machinery Export Reaches Record in 1928

United States exports of industrial machinery, aided by a gain of 28 per cent during November, reached a total value of $190,820,000 during the 11 months of 1928, already $8,000,000 higher than those of the entire year 1927, according to the Department of Commerce. Industrial machinery shipments this year far exceed the exports for any complete year since 1921, the last year of the post-war boom period.

Metal-working machinery continued to be a consistent trade gainer, and both for November and for the 11-month period made noteworthy increases. The gain for the month in this class of machinery was 45 per cent and for the 11 months 37 per cent. Exports of lathes have risen from $2,989,000 to $4,085,000 for the 11 months, milling machines from $1,233,000 to $2,080,000 and drilling machines from $845,000 to $1,499,000. Exports of sheet and plate metal-working machines have increased from $1,268,000 and $2,567,000, or more than double.

Events Cast Their Shadows Before Them

With the National Machine Tool Builders Exposition, to be held in Cleveland, Sept. 30 to Oct. 4, over eight months off, space in the Public Auditorium has already been oversubscribed and a waiting list started for those who may come in through cancellations of others. Space has been allotted to member companies in the West Annex, while the Arcade will house heavy machinery of non-member companies, and the Arena light machinery of the same group. The remaining space on the Arena floor will be taken up by exhibitors of direct and component accessories, but in the latter group all could not be accommodated, previous exhibitors being given preference. If this information is any indication of interest in the show, there should be no question of its success. Whether there will be shown in this exhibition as many innovations in machine design as were brought out at the 1927 show is still problematical at this early date.

Patent Insurance Offered

Patents, one of the most valuable forms of industrial property, now for the first time may be protected by insurance, under the plan of the Patent Insurance Co., of Hartford, Conn. Manufacturers, vendors and patent owners may protect themselves against claims of infringement, and be indemnified for losses and expense arising from patent litigation, through regular policies of insurance. The policies provide the patent owner or licensee with a practical and economical means of enforcing his rights and defending his interests. As many patents have little or no value until adjudicated, the fact that the company will undertake to handle all this litigation, if necessary, is a valuable feature.

Study of Obsolescence Now Under Way

With its study on obsolescence of industrial machinery actually under way in connection with the American Knitted Outerwear Association, the Domestic Commerce Division of the Department of Commerce is considering plans for making similar surveys of a half-dozen other industries. It is expected that by the end of January a study will be in progress of the mechanical equipment of the wood-turning industry. By means of the successive studies that it is planned to make, it is believed that accurate information will be obtained on the part played in the relative prosperity of an industry by the efficiency of its mechanical equipment. Better methods of accounting practices as they relate to obsolescence, are expected to result also from these studies.

U. S. Steel Orders High in December

The U. S. Steel Corporation's unfilled tonnage December 31, 1928, amounted to 3,976,712 tons, compared with 3,673,000 tons on November 30, an increase of 303,712 tons. This increase of 303,712 tons during December indicates that business received during the month was the largest of any month since the early part of the year, despite the fact that in the closing month of the year consumers usually restrict their orders to the utmost and that business is interrupted by the holidays.

Immediate indications in the steel industry are highly satisfactory. With the inventory-taking season about over, held-up business is being released, which has already been reflected in a further gain in operations. In addition, the railroads are again showing an interest in the market. Orders already placed account for a considerable tonnage of steel.

Educational War Orders Under Discussion

The National Association of Manufacturers, the Chamber of Commerce of the United States and similar bodies have appeared before the Military Affairs Committee of the House of Representatives to urge favorable action on the Morin Bill which authorizes the Secretary of War to place educational orders for equipment, munitions and accessories with commercial concerns in peace time so as to familiarize them with ordnance manufacture as a measure of national defense. Among those on the Industrial Preparedness Committee of the manufacturers' association are R. K. LeBlond; W. F. Dixon, the Singer Manufacturing Co.; and F. A. Scott, Warner & Swasey Company.

Aircraft Firms Continue to Erect Factories

The Aeronautical Corporation of America is to build a factory building 300x100 ft. at Lunken Airport, Cincinnati, in the spring, and will manufacture there a low-priced plane, selling for $2,500 without motor. LeBlond motors will probably be used in the first models, although the company plans to make its own motors eventually. Conrad G. Dietz is general manager. D. C. Killer, president of the Dow Drug Co., is president, and Stanley Taylor, secretary of the American Laundry Machine Co., is vice-president.

The Whittlesey Body Co., Bridgeport, Conn., manufacturer of auto bodies, has acquired exclusive American rights to manufacture Avro Avian sport biplanes for the A. V. Roe Co., Ltd., of London. The company will use 40,000 sq.ft. of floor space for this purpose and will start this new line at once. Newtown Whittlesey heads the company. The plane is a popular English sport model, single-motored.

W. E. Packman, chief inspector of the Cirrus Aero Engines, Ltd., arrived in New York last week to supervise the production and testing of the American Cirrus Mark III engine to be made at Belleville, N. J. The factory is in charge of A. G. Lloyd, production manager.

The Lycoming Manufacturing Co., subsidiary of the Auburn Automobile Co., has entered the aircraft-engine field. Its first motor was exhibited at the automobile show in New York last week. The company plans to be in production on a basis of 175 engines a month by April 1, it is said.

BUSINESS BAROMETER . . . . *Decline in building contracts in December the only discordant note in the symphony of industrial prosperity*

By THEODORE H. PRICE
Editor, Commerce and Finance, New York

From this page the reader will get a quick picture of current business and industry. The boxed material below is a summary of the letters from regional correspondents of the American Machinist, published in full on the opposite page.

DRAWING food and fuel literally from the air, the army airplane "Question Mark" last week completed a flight during which it remained aloft six and a quarter days. This may seem an odd preface to a review of business conditions, but it is more apropos than may at first appear, for the flight is not without its resemblance to the record-breaking performance of the stock market, which continues to be the big question mark of business. The market is still aloft; each time it glides downward it is successfully refueled before a landing becomes necessary, and thus far there is no sign of motor trouble serious enough to interrupt its flight, though everyone realizes it cannot stay in the air indefinitely.

During the first part of last week the tendency of the stock market was downward. Its hesitancy was variously ascribed to the big increase in brokers' loans reported for the previous week and to fears of an early advance in the Reserve Bank rediscount rate. But by Wednesday the reaction seemed to have run its course, and on Thursday afternoon the bears sustained a defeat when the directors of the New York Reserve Bank failed to raise the rate, and an "easy money" weekly statement was issued. This statement showed a decrease of only $17,000,000 in brokers' loans, but the return of gold and currency to the member banks enabled them to reduce their borrowings from the Reserve Banks by $275,000,000. The year-end stringency, is therefore fully relieved, and stock market money is again available at 6 per cent.

As dear money rates during the holidays failed to depress stocks, it would be paradoxical indeed if a decline should set in now that money is cheaper. And as a new high price of $600,000 was paid last week for seats on the Stock Exchange, some obviously expect that the market will have another fling before the long-heralded liquidation begins.

But few look any longer to money rates for guidance to the immediate future of the stock market. For that the commercial and industrial news must be examined, and, until it contains some definite signs of coming business recession, it is assumed that breaks in stocks will be relatively brief in duration, though perhaps severe in proportion to the magnitude of the speculation for the advance.

The brief record that is thus far obtainable of the entry of business into 1929 is a song of prosperity with but one inharmonious note. That is a decline in building contracts awarded during December, according to the F. W. Dodge Corporation, to a figure 9 per cent less than in the same month of 1927; a drop of 27 per cent in the work contemplated at the end of 1928 as compared with a year earlier; and a decline of 14.8 per cent in building permits issued during the month, according to *Bradstreet's*.

This downward tendency in construction, if long continued, will be felt in the building materials, equipment, machinery, and furnishings industries, and by labor; and the figures may signify, as they have often done in the past, that a period of contraction is being ushered in. But it is only fair to point out that a similar slackening in building occurred late last summer and in the early fall. It proved to have no significance, and the trend quickly turned upward.

And it is a fact, though superficially a surprising one, that new financing, which should vary inversely with money rates, was as large in 1928, as it was in 1927, when loans could be floated at a materially lower cost. The explanation is that dearer money has not impaired confidence, and that, while it has been more difficult to sell bonds, it has been easier to sell stocks. New financing was active during the last two months of the year, and in that direction 1929 opens auspiciously.

Except for the building figures the reports from industry are extremely cheerful. Production of iron and steel has jumped ahead to a rate higher than any reached in December, in which the total steel production was the greatest of any December on record. The reason is revealed in an increase of 303,712 tons in the unfilled orders of the United States Steel Corporation during that month, and the trade reviews say that business since Jan. 1 has been large.

The automobile manufacturers also are increasing their output to a rate well above the same period last year, and they apparently will be able to keep it up during the first quarter at least.

This constitutes a picture of business under a momentum which will not soon be lost, even if the forces that will eventually compel a recession are operating beneath the surface. The chairman of the Chase National Bank in New York warns that, while business has profited through the expenditure of funds gained by sale of capital assets at a profit and treating the profit as income, "Neither the government nor the business world can afford to rely upon an indefinite continuance of a rising stock market. Both should consider the possibility of a reduced national income when profits from capital appreciation are reduced."

There is nothing unsettling in the political situation or abroad, and, as the optimistic estimates of the forecasters are generally accepted for the first quarter at least, good business during that period seems assured.

INCREASED activity in machine tool and machinery buying is noted in many industrial centers now that the holidays are past. An unusual January, as far as volume of orders goes, is expected in the Detroit area, and many dealers there have received a normal month's business in the first ten days due to the rebound of the automotive industry after a less-than-usual seasonal lull.

IN CINCINNATI, business in machine tools is on an excellent level and the demand for equipment has been on the increase since Jan. 1, so that the month should be better than December. The same situation is true of Milwaukee, where many industries are represented in the buying. A resumption of activity is also noted in New England. No recession has been experienced in the Chicago market in either orders or inquiries, the feature being the issuance of a large list by the International Harvester Company.

ANTICIPATED purchases by the aeronautical industry make the outlook in Buffalo excellent, and a large volume of inquiries gives encouragement to Philadelphia dealers and manufacturers, although orders are somewhat spotty. Sales are also spotty in Cleveland, where the automotive shops are leading in the buying. In New York, on the other hand, well scattered sales are keeping the market on an even level.

MANUFACTURERS continue to fall behind on deliveries, and the situation has been aggravated by the shortage of skilled help. While the index of machine tool orders fell during December, the three-months average still continues upward, according to the National Machine Tool Builders Association.

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The Industrial Review

The week's progress of the machinery and machine tool business

THE following reports, gathered from the various machinery and machine tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

NEW ENGLAND

New England is featuring a resumption of a high level of industrial activity without delay. Machinery and machine tool manufacturers are increasing working schedules at every opportunity. Skilled labor is scarce, however, and is an added problem to work against the delivery enigma.

During the first half of January a sizable volume of orders for single tools was received, together with some good inquiries. Buyers are displaying an early interest, and are representative of a variety of industries. Used equipment dealers have sold many units for replacement, and report, generally, a good start for 1929. Indications at this time anticipate business for January comparable in total with December.

The current week was the most active of the month. Representative orders in the territory included the folowing tools: jig borers, lathes, vertical drill and several bench drills, grinding units, milling machinery and board drop hammers.

The latter order for 21 units was placed with the Billings & Spencer Co., by the International Harvester Co., and involves new business to the amount of $50,000. The Billings & Spencer Co., is very busy and is equipping a new unit for broaching wrenches and like tools, and will supply the Ingersoll Rand Co. with all its requirements of this nature for the whole year.

DETROIT

The machinery and machine tool trade in the Detroit area is experiencing an unusually prosperous January, and in many cases the dealers have received more orders in the first half of the month than they ordinarily get in all of January.

Not only are there excellent prospects for the year, but there are many tangible evidences that conditions will be as good as 1928, which was a remarkable year for this vicinity. The motor industry is going forward rapidly and as long as this is the case the machinery and machine tool men will prosper. Many large orders have been received, a great many inquiries are coming in, and some of the offices are busier than they have been at any time in the past two months.

Not only are the automobile companies planning big production programs, but they are making many changes, and as always this works to the advantage of the machinery and equipment dealers.

In every way the year is starting out very auspiciously here.

BUFFALO

While business for the year 1929 is scarcely under way as yet, conditions already justify the anticipations expressed a fortnight ago. The fact that approximately $3,000,000 is to be spent on equipment of a highly specialized nature to enlarge and modernize the existing aircraft industries in Buffalo will undoubtedly have a highly salutary effect on the business throughout the year. The Buffalo City Council early in January authorized expenditures of upward of $1,000,000 to improve and enlarge the facilities of Buffalo airport so that aircraft industries will be encouraged to go ahead full-tilt in their development here, assured of ample airport facilities.

Comparatively speaking, conditions are somewhat more quiet in the electrical equipment field. However, it is expected that this will show a marked improvement before the end of the month.

Thus far the winter has been an open one. Unless snow, and plenty of it, arrives before the end of this month, it is likely that sales of snow removal equipment will be rather light. The demand for other classes of equipment in the contracting field is light at present.

CINCINNATI

The great majority of the machine tool manufacturers in the Cincinnati district report that in the past week business was at an excellent level. With most of the concerns the demand has been increasing gradually since the first of the year, and in no case was a falling off of business reported.

Typical comments made by manufacturers were in substance as follows: "While December was a good month with us, January promises to be still better." "The new year has started out in a fine way, with business holding up well and with inquiries coming in freely." "General business conditions are very good and our volume of sales is at a good level." "We are having a fine demand, with orders coming from all sections of the country." "While there is no outstanding feature, the market is holding up well and inquiries are both numerous and of a satisfactory nature."

Selling agents report that in the past week the demand was at what may be called a better-than-fair level in local and adjacent territory, with market conditions improving in an encouraging way.

While there were scattering orders which called for several pieces of equipment, the sustaining feature of the week's market was the sale of single tools to purchasers all over the country. The week's inquiries were both numerous and well diversified, the great majority coming from miscellaneous users.

While an epidemic of influenza has had some tendency to interfere with manufacturing activities, it has not been a serious handicap up to the present time. There is no surplus of skilled labor, however, and it is practically impossible to replace those on sick leave.

CLEVELAND

A résumé of business for the first ten days of the new year indicated that a spotty condition prevails in the machine tool field. Sales so far in January have been of relatively small volume. Improvement of the present situation is expected as soon as prospective purchasers, who deferred action during December, consummate outstanding inquiries. A bright spot is reported by a leading dealer who stated that the new year opened with a "bang" and is going strong each day.

A large portion of recent buying has been done by the automotive industry.

Export business is increasing in volume. A local concern has received a cable order from Vellancourt, Seine, France, for a 6-in. forging machine that will weigh 200,000 pounds. Statistics show that, industrial construction gained in 1928 over 1927. There were 206 building permits issued in 1928 for new factory construction to cost $3,925,400, compared to 130 permits to cost $2,503,000 as issued in the previous year.

MILWAUKEE

After an almost imperceptible holiday lull, metal-working equipment demand is again on an upswing and production is continuing on a high level, with numerous shops unable to make any gains against unfilled orders. In some instances this situation is without precedent in peacetime and actually is strongly reminiscent of the hectic war period in the insistence of customers upon getting prompt deliveries. Automobile factories appear to exert the greatest pressure in this direction, with large production schedules justified by the current sales of passenger cars and trucks. Makers of parts, units and accessories are under such pressure from their customers that steps are being taken to increase production, a development reflected by the growing number of inquiries from these industries.

It is also to be observed that builders of aircraft engines are clamoring for production tools in an unprecedented manner, and this industry undoubtedly will be a greater factor in tool business this year than ever before. Much of the demand is for special equipment, for which delivery is furtherest behind.

There is also a strong demand for equipment from manufacturers of agricultural machinery, farm and industrial tractors, and shops specializing in heavy-duty gas and oil engines. Despite the heavy purchases by this group during the greater part of last year, it appears from present orders and the large number of inquiries that 1929 will be a better year.

CHICAGO

From all accounts, neither orders nor inquiries for machine tools thus far this year show any recession from the average of December. Manufacturers' representatives and dealers report a steady and continuous volume of new inquires for standard equipment, and express the belief that the total business for the month will equal that of last month. Demand is from widely scattered sources, and includes tools of every type. No lists of importance are reported, inquiries and orders being for single tools and small lots. The International Harvester Co., however, is said to be considering a large outlay for its implement and tractor shops, a few of which are to be enlarged for greater production.

The fact that some of the Western railroads have voted unusually big budgets for improvements furnishes reasonable grounds for the stated belief that a liberal allotment will be made for machine tools. The Chicago Rock Island and Pacific, the latest road to furnish tentative figures for the current year, is reported to have appropriated for improvements $25,000,000, exclusive of equipment.

Business in used tools continues on a good level.

PHILADELPHIA

A spotty condition prevailed in the machinery and machine tool market throughout the Philadelphia district during the last two weeks. Some sales to the Chrysler Co. of Detroit, some purchases by a motor boat manufacturing company and some scattered sales to general industrial lines were noted by dealers.

Inquiries from large industrial lines, which have communicated with manufacturers of heavy tools and equipment here regarding purchases for early delivery, have given much encouragement to the trade. Indications are that some substantial orders

would be closed within a short while. On the whole, the year is starting out with better prospects than did 1928, which was regarded by many as the best since the post-war peak.

There has not been any material change in the railroad situation so far as this market is concerned. Only purchases for immediate needs have been made by the carriers, and their inquiries do not hold out a great deal of promise, dealers said.

NEW YORK

Machine tool sales in the New York market on the whole are being maintained at a level comparable with last month for most dealers. Some factory representatives, however, indicate that there has been some hesitation in placing of orders, but that before the month is out many active leads will have materialized in orders. Buying is well scattered and is coming from sources not heard from in some years in many cases. There is every indication of activity on the part of the metal-working shops in the vicinity. About the only drawback being suffered is coming from the delivery situation which grows steadily worse, in some cases six months hence being the earliest date for delivery promised for certain special types of machines.

The General Electric Co. has bought a number of machines, mostly presses, for its refrigerator manufacturing department in Schenectady. Other buyers in recent weeks have been the Sperry Gyroscope Co., the American Cirrus Engines Co., and R. Hoe & Co. Among the tools bought by the last was a 36-in. lathe. Most of the structural shops have been busy for some time on subway orders, and have been the source for machinery orders from time to time. It is too early to appraise the railroad situation, but the outlook is hopeful. Second-hand equipment is finding a ready market, particularly in view of the acute delivery situation in new tools, but the dealers are finding difficulty in laying their hands on good used equipment to turn over.

The Pratt & Whitney Co. sold in the last week: Thirteen lathes, eight bench lathes, three grinders, two jig borers, two vertical shapers, one bench miller and two centering machines.

The Triplex Machine Tool Co. reports the sale of: Two Campbell nibbling machines, one large power press, one Osterlein cutter and tool grinder, one metal bandsaw, one large Sibley upright drill press, and two small bench drill presses.

Business Items

The Wilcox-Rich Corporation and the Rich Tool Co. have consolidated, and the latter company will be operated as the Rich Tool Division of the Wilcox-Rich Corporation. All production and engineering activities will be continued at 1501 E. Ferry Ave., Detroit. The sales office will be in the General Motors Building. The same personnel of the Rich Tool Co. will be continued.

Articles of incorporation have been filed by the New Albany Machine Manufacturing Co. of New Albany, Ind. The corporation is formed to "engage in the business of operating a foundry and machine shop." It has an initial capital stock of 2,000 shares of no-par value common and $100,000 of preferred stock. The directors are Henry H. Martin, Carl W. Martin and Edward J. Raverty.

On Jan. 1, the Husky Wrench Co. changed its name to the Husky Corporation and moved into new quarters in Kenosha, Wis., on the shore of Lake Michigan. The factory building contains 40,000 sq.ft. of floor space, is built of brick, concrete and steel, and is modernly equipped to produce Husky wrenches and similar products. A separate office building is provided.

The Atlas Manufacturing Co., New Haven, Conn., and the Ansonia Novelty Co., Ansonia, Conn., have merged as the Atlas-Ansonia Co., and will occupy a modern plant at 54-62 Grant St., New Haven, Conn. New equipment has been installed.

The Foote Bros. Gear & Machine Co., of Chicago, has established a branch office in New York City which will be in charge of E. A. Phillips with headquarters at the Woolworth Bldg. New England, New York as far west as Rochester, and northern New Jersey will be the territory covered.

The Detroit Lead Pipe Co., 600 Larned St., Detroit, has been appointed exclusive sales agents for the Weil "Lectrospray," made by the Weil Lectrospray Co., of Detroit.

The Bullard Machine Tool Co., Bridgeport, Conn., has changed its name to the Bullard Co. Management and product will continue as before.

Personals

Miles S. Potter, general superintendent and puchasing agent for the John Deere Tractor Co., Waterloo, Iowa, has resigned to become general manager of the heating division of the Modine Manufacturing Co., Racine, Wis., manufacturer of automobile radiators and unit heating systems. Joseph L. Cramer, purchasing agent for the John Deere Harvester Works in Moline, Ill., will succeed Mr. Potter.

Frank Toomey, formerly president of Frank Toomey, Inc., 127 N. Third St., Philadelphia, machine tool dealer, has changed the name of the firm to the Frank Toomey Machinery Co. and has moved the office and salesroom to 130 N. Third St. Arthur S. Day, formerly connected with the Day Machinery Co., of Buffalo, is now associated with the Toomey concern.

A. W. F. Green has been appointed a sales representative of the Poldi Steel Corporation of America, of New York. For the past 17 years he has been with the John Illingworth Steel Co. as metallurgist and sales and service metallurgist. He is secretary-treasurer of the Philadelphia Chapter of the A.S.S.T. and a lecturer at Temple University.

W. C. Stettinus has resigned as president and general manager of the American Hammered Piston Ring Co., Baltimore, Md., but he will remain vice-chairman of the board. Allen W. Morton has been elected president and general manager.

Wm. J. Hanley, manager of the East Central District (Cleveland) of the General Electric Co., and Charles K. West, manager of the Atlantic District with headquarters in Philadelphia, have been elected vice-presidents in charge of the commercial activities of their respective districts.

M. A. Gordy, Morris Bldg., Atlanta, Ga., is now district manager at Atlanta for the U. S. Electrical Tool Co., of Cincinnati. Previously he had handled a number of lines as manufacturer's agent, but will now devote his full time to the "U. S." line of drills and grinders.

Arthur E. Blackwood has been elected president of the Sullivan Machinery Co., Chicago, in place of the late Frederick K. Copeland. For the past 10 years, Mr. Blackwood has been first vice-president in charge of finances.

R. F. Judisch has been appointed production manager of the Hoover Co., North Canton, Ohio, in place of W. F. Bailey, whose death was announced recently.

Obituaries

John Candee Dean, 83 years old, for forty years affiliated with the Dean Brothers Co., maker of pumps of all descriptions, and other machinery, died recently in Indianapolis. Mr. Dean was the last survivor of the Dean brothers, who came to Indiana in 1869 from Rome, N. Y. He had been ill for about two years. He was a widely known student of astronomy. Mr. Dean's company was one of the oldest in Indianapolis. It was founded in Rome, N. Y., in 1867 and moved to Indianapolis two years later. In 1881 it was incorporated under its present name and at the time of his death, Mr. Dean was president and treasurer.

Emerit E. Baker, aged 73 years, founder and president of the Kewanee Boiler Corporation, Kewanee, Ill., now an American Radiator Co. subsidiary, died Jan. 1 in Hot Springs, Ark., where he went two months ago to regain his health. Mr. Baker at 17 became office boy for the old Anderson Steam Boiler Co. the first manufacturing industry in Kewanee. He advanced rapidly and in 1892 launched the Kewanee Boiler Co., which was incorporated with $100,000 capital, which is now $3,500,000 and has a payroll of 1,300 employees. Beside his industrial activities Mr. Baker was widely known for his interest in charity.

Charles A. Rassmann, 53 years old, vice-president of the Vonnegut Machinery Co. of Indianapolis and a lifelong resident of the city, died recently at his home following an illness of two years. His condition, however, did not become serious until two months ago when he stopped work. In 1910 he became associated with the machinery firm as sales manager and vice-president.